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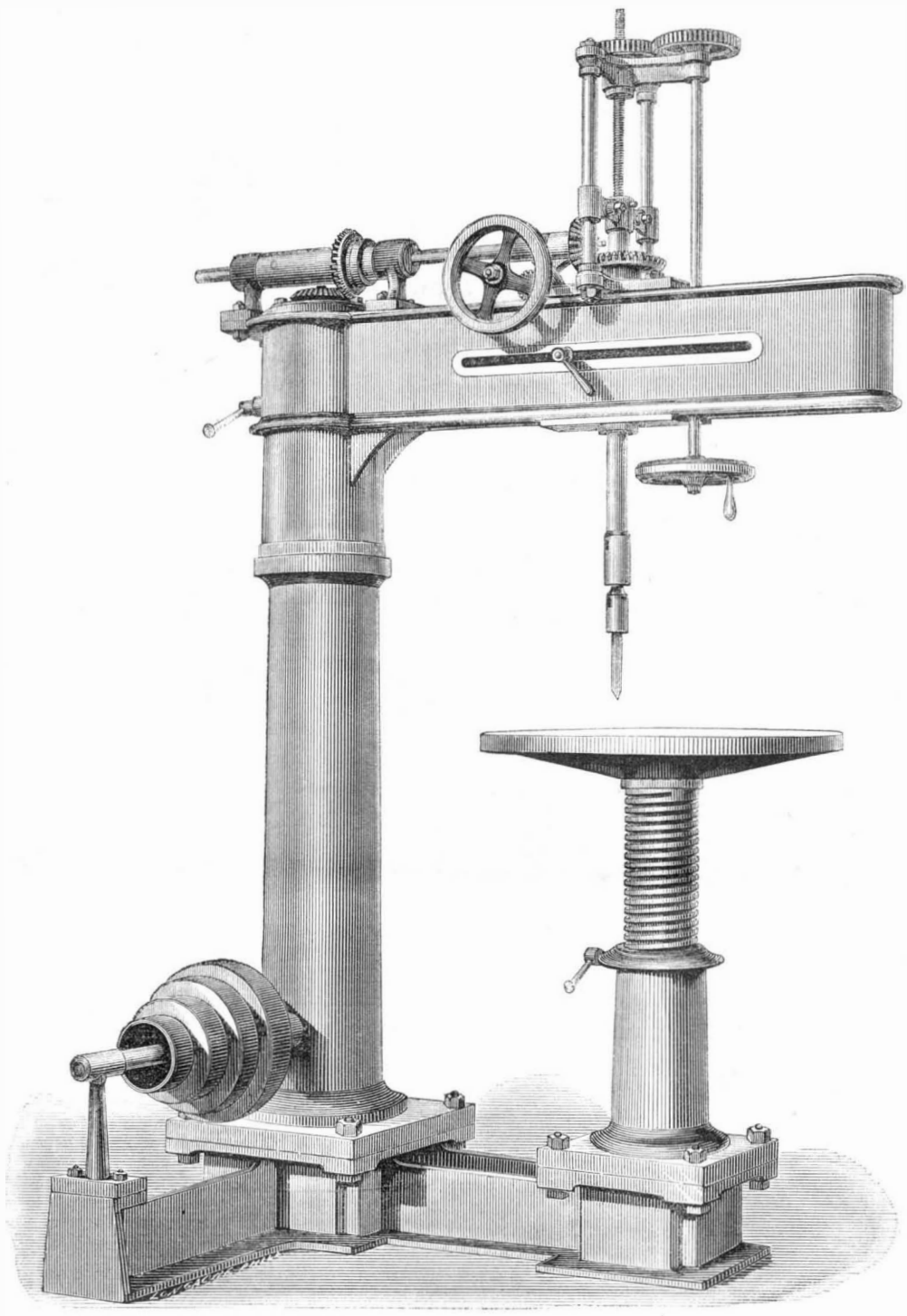
Improved Radial Drill Press.

There is no more indispensable machine, in metal-working establishments, than a good drill press, and much ingenuity has been shown in planning them so as to obtain the greatest possible efficiency for the least cost and weight of metal. The improved radial drill illustrated herewith has this advantage over others in ordinary use, that it adapts itself to the position of the work to be drilled, thus obviating the necessity of moving and adjusting the latter, which, in the case of heavy pieces, is often tedious and difficult.

The manner of accomplishing this will be readily understood by reference to the annexed figure, in which the spindle is shown in its proper position, over the table, for small work. The radiating arm is fitted to a neck at the top of the column, and traverses freely in all directions; in this, slides the head, carrying the drill-spindle and gearing, which is moved backwards and forwards by a rack and pinion and hand-wheels, one on each side of the machine.

It will be seen that the arm or swing is capable of being placed in any position, radiating from the column as a centre, and that the drill can hence be made to reach any point within the circle, except the part occupied by the column and the driving pulley. A large number of holes may thus be drilled in succession in the same surface, without moving the work, an advantage which will commend itself to machinists. The difficulty of leveling up a piece to be drilled for every hole, the time thus spent, and the danger of moving it after starting the drill, are annoyances that do not attach to this machine. When once the work is judiciously and firmly placed, a series of holes may be drilled, each of which will be perfectly parallel with the others. We have seen the machine at work in a number of shops, and consider it an excellent tool. It is especially useful in fitting up such work as steam engine cylinders, steam chests, bed plates, etc. All work which cannot be conveniently handled may be drilled by once setting it, instead of frequent changes of its position, thus saving a vast amount of labor and inconvenience. They have been adopted by many of the best shops in the country. They are manufactured and sold by R. H. Barr & Co., Wilmington, Del., whose advertisement may be found on an other page.



RADIAL DRILL PRESS.

The Siphon Feed Water Regulator and Purifier.

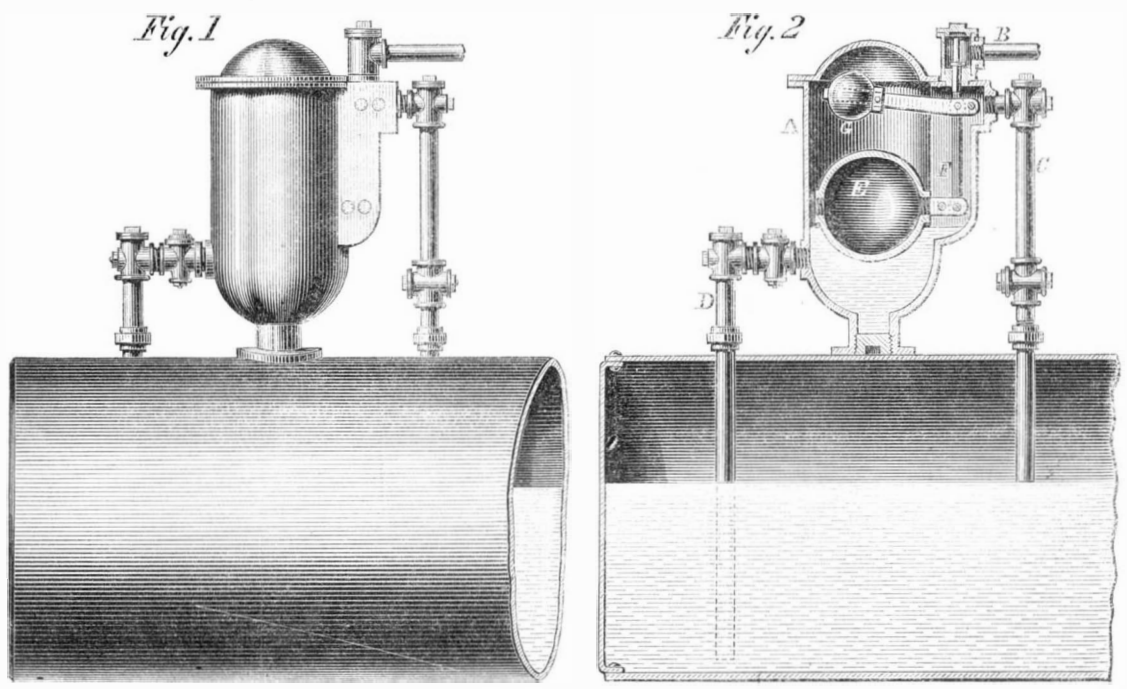
The objects accomplished by the invention herewith represented, are four-fold: the regulation of the water fed to a steam boiler; the absolute prevention of low water; the prevention of explosions, or injury to boilers so frequently caused by unequal expansion and contraction from the variable temperature at which water is usually fed to the boiler; and the purification of the feed water before reaching the boiler, and the deposition and easy removal of the deposit. The apparatus is very simple in construction and entirely automatic in operation. It is, in reality, a siphon, the short leg of which is alternately a conduit for water and steam. Fig. 1 is a perspective view of the apparatus as applied to a horizontal boiler. Fig. 2, to which the letters of reference are attached, is a section showing its internal construction. The reservoir or dome, A, is of cast iron, in the form shown, bolted to the top of the boiler at the point deemed most convenient. At its top it receives a pipe, B, connected with the feed-water pump and is the water supply pipe. The passage from the interior end of this pipe to the dome, A, is governed by an ordinary upward-lifting valve, or check valve, as seen plainly in Fig. 2. Just below the inlet pipe, B, is the pipe, C, connecting with the steam space of the boiler, having its lower end at the desired level of the water and forming the short leg of the siphon. Near the bottom of the dome is another pipe, D, forming a communication with the dome and the water space of the boiler, its lower end reaching nearly to the boiler bottom, as shown by the dotted lines in Fig. 2. This is the long leg of the siphon. Both these pipes are, of course, open at the bottom and each are provided with cocks to be used, if necessary, to close communication between the interior of the dome and the boiler when the dome is to be cleared of the sediment deposited by the water. Inside the dome is a hollow lever float, E pivoted to the rod, F, and balanced by the adjustable weight, G.

When the water falls below its proper level, exposing the open lower end of the pipe, C, steam, of course, passes up into the dome, A, and the water contained in it and supporting the float, E, will descend, carrying with it the float and opening the valve to the inlet of water through the pipe, B. So long as this valve is open, water will, consequently, be forced in by the pump through the pipe, D, to near the bottom of the boiler. Soon as the water rises sufficiently to cover the end of the pipe, C, no more steam will enter the dome, equilibrium will be restored, and the valve closed. If the pump is kept continually at work a side pipe may be used to carry off the overplus of water. Thus the hight of water in the boiler will be automatically preserved at an absolutely uniform level.

The apparatus heats the feed water in the chamber, A, to the same temperature as the water in the boiler, thus preventing the unequal expansion and contraction of the iron. In addition to this office of the apparatus it is intended also to separate and precipitate the salts and earthy matters held in solution, as the water admitted to the dome becomes vaporized by the steam admitted through the pipe, C, and consequently parts with its impurities, which, being specifically heavier, sink to the bottom of the dome, from which they can be readily removed on taking off the top of the dome. Applied to marine or other boilers subject to foaming the apparatus will work as a regulator to the feed, fully as well as where there is no such annoyance.

This apparatus has been in practical use for two years on eleven steam boilers, and has been subjected to all the tests necessary to prove its absolute reliability.

A simple adaptation makes this arrangement equally appropriate to an upright boiler, as it may be attached to its side or to the front of a horizontal boiler, if preferred, instead of on the top. It is the subject of two patents, dated respectively Feb. 19, 1867, and Nov. 5, 1867. For further particulars, address H. B. Beckman & Co., Newburgh, N. Y.



IMPROVEMENT IN FEED WATER APPARATUS FOR STEAM BOILERS.

To make an amusing sympathetic ink, mix lemon and onion juice. Writing or pictures made with this mixture on plain white paper, will, when dry, be invisible. But on warming the paper before a fire the lines will appear in brown tints. Very pretty effects may be thus produced.

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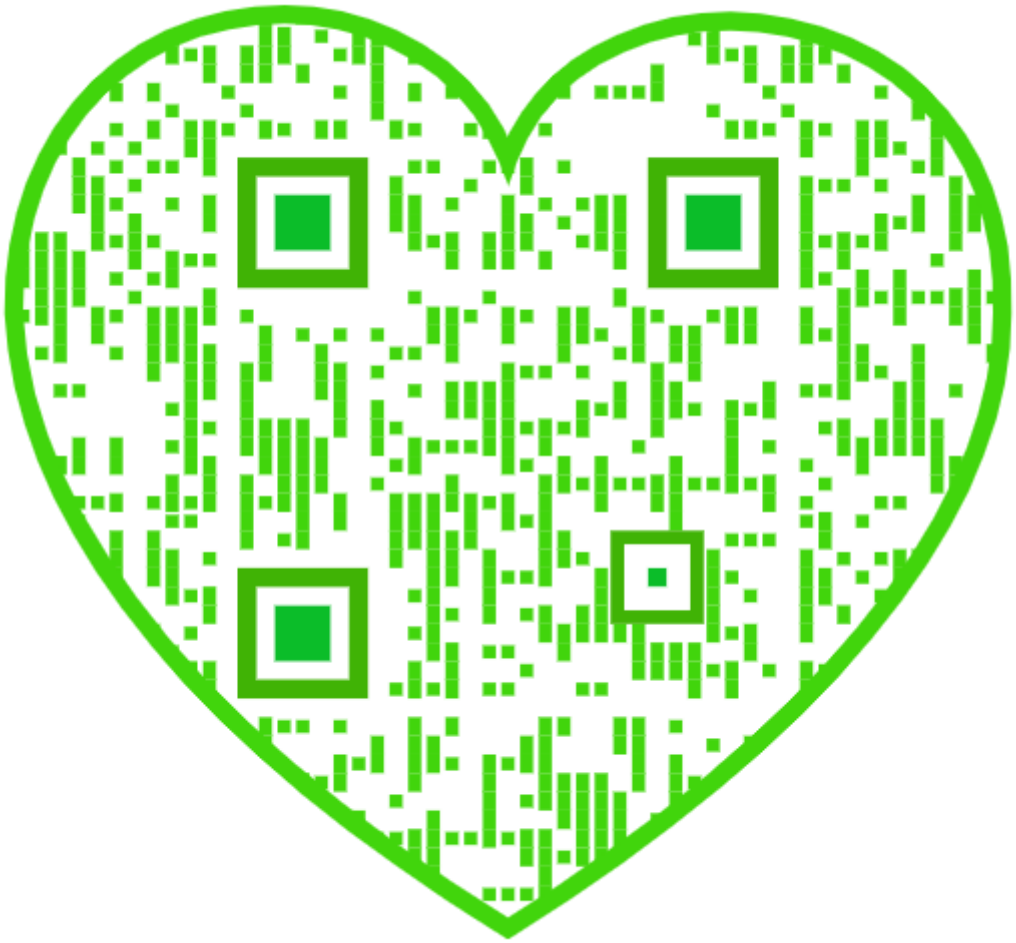

THE TWINS OF CHEMISTRY---POTASSIUM AND SODIUM.

Standing before us are two small bottles, each containing some shining metallic globules, not unlike shot in appearance. Surrounding these globules and completely covering them, is a peculiar fluid called naphtha. The metallic globules are potassium and sodium. Their appearance is so similar, that unless the bottles were labeled, it would be difficult to distinguish one from the other. The external appearance of these metals is not the only point of similarity between them, as we shall presently see. We extract from the bottle labeled potassium, one of the little balls, holding it in the forceps for a moment exposed to the air; the naphtha quickly evaporates, the beautiful bluish white polish disappears, and a greyish white, lusterless surface, replaces it. If we now project this little ball upon the surface of some cold water, lo! it does not sink; a beautiful rose-colored flame bursts forth from it. It seems to become animated, and shoots about over the surface as though it were alive. But its life is short, the flame rapidly decreases in size, and finally dies out altogether. The globule has disappeared, leaving apparently not a single trace of its existence. We shall presently see where it has gone; but first, let us make some other experiments. Taking now a globule of sodium, we find upon exposure to the air that it rapidly tarnishes like the potassium; projecting it upon the water, it rapidly decreases in volume, but no flame is emitted. Soon it also disappears without trace, as did the potassium. We repeat the experiment with hot water. This time we get a brilliant display, discharges of little balls of melted sodium in an incandescent state, fly off in all directions like a miniature Roman candle. Another striking experiment can be performed with potassium, a fragment of this metal being twisted into the dry wick of a candle, you may light your candle with an icicle, provided the room is warm enough to form a single drop of water on its point. The oxides of potasium and sodium have been dissolved by the water, which accounts for their disappearance.

These experiments properly understood, will give us considerable knowledge of the nature of these metals. From them and what we have already said, we may learn the color of these metals—bluish gray; their low specific gravity—they float upon the surface of water; their great affinity for oxygen, shown by their rapidly tarnishing when exposed to the air, and their deportment when thrown upon the surface of water. It is the oxygen of the ai , which, uniting with these metals, forms the greyish-white oxide which dulls their brilliancy. It is the oxygen of the water, which uniting with them, gives rise to the beautiful display we have described. The union is attended by heat, sufficient to ignite the hydrogen liberated in the decomposition of the water (water being composed of oxygen and hydrogen), and some vapors of the metal being mixed with the hydrogen gas, impart to it the splendid rose-color which is so striking a feature of the experiment.

We, lately, introduced you to the Goliath; we, this week, present to you the Twins of Chemistry. The discovery of these metals marks an era in the science. They were both discovered by Sir Humphrey Davy, within a very short period, their separation from oxygen being effected by the action of a voltaic battery of great power. Their affinities for oxygen are so great, that up to the time of their discovery 1807, potassa, a compound of potassium and oxygen, and soda, a compound of sodium and oxygen, had been regarded as elements, although they had been suspected to be compounds. It is not unlikely that some substances now regarded as elements, may also hereafter be found to be compounds, a number of them exhibiting peculiar properties, which indicate the possibility of their non-elementary character. We have called these metals twins, not only on account of the fact that they were born to Chemistry so nearly at the same period, but also on account of the many points of similarity which they possess in properties and appearance. They both possess very strong affinity for oxygen, as we have already shown, and in order to prevent their uniting with it they are kept covered with naphtha, which contains no oxygen, its elements being hydrogen and carbon. Their oxides are alkalies; that is, they possess the following properties: They are readily soluble in water; they combine with and neutralize the strongest acids; they change certain vegetable blues to green, and some yellows to brown; vegetable blues which have been changed to red by the action of an acid, are restored by their action. These properties belong to the oxides of a class of elementary substances, which are called alkali metals, of which there are five in all, the two under present consideration being plentiful and of great importance in the arts, and the others of rare occurrence.

The oxide of potassium is called potassa, and the oxide of sodium is called soda. An impure carbonate of potassa called potash, and an impure carbonate of soda, called soda ash, are the most common forms in which these substances are met with in commerce and the arts. The metals are never found naturally pure, and are obtained in that state, by the somewhat difficult, and sometimes dangerous process of distilling the carbonates of their oxides, in an iron retort of peculiar construction, with charcoal, and collecting the vapors of the metals in a receiver containing naphtha, and kept cold by immersion in water.

The rationale of the above process may be thus described: Carbon, in the form of charcoal is, at ordinary temperatures, one of the most inert and unchangable of all known substances. It will remain for ages unaltered by the action of other elements, until its energies are aroused by heat. When heated to the point of combustion, its affinity for oxygen is greater than any known substance. We have seen the powerful affinity that potassium and sodium have for oxygen, but their strength is weakness to that of carbon, when its temper (ature) is up. It is irresistible, and it wrenches, as it were by main force from them, the oxygen to form with it carbonic acid (six parts by weight of carbon, and sixteen of oxygen); leaving them to be volatilized by the heat, and recondensed in the naphtha as above described.

The grand natural source from which the supply of potash is obtained, is the ashes of wood and other vegetable matter. The potassium exists in the plants previous to combustion, having been absorbed by them from the soils in which they grew. The soils obtain the potash from the decomposition of rocks, clays especially, having a large proportion, derived from the decomposition of feldspar, which contains from ten to twelve per cent of it, and from mica, which contains from five to six per cent. It is also found combined with other substances in sea water. The potash is obtained from the ashes by filtering water through them, which dissolves out the potash (technically called leaching), and boiling down the solution until a large portion of the water is expelled. Its affinity for water is so strong, however, that it always retains a portion combined with it chemically to form a definite hydrate. The only ways in which it can be obtained in an anhydrous form, are direct combination with oxygen, or the expulsion of hydrogen and consequent decomposition of the water, by heating the hydrate of potassa with pure metallic potassium.

A few years since, the western villages of this State could almost universally claim a potashery, either in an active or extinct state. Now they are gradually giving way before the increased consumption of coal, to sections where wood is plenty and cheap, and consequently the staple fuel.

Soda ash, otherwise carbonate of soda, is obtained by converting common salt (chloride of sodium) into sulphate of soda, the decomposition of the sulphate of soda into a crude carbonate, called technically black balls, and the purification of the latter, till it is the white, marketable soda ash of commerce. The first part of the process is done by heating oil of vitriol (sulphuric acid) with common salt, in a reverberatory furnace. In this reaction the sodium is separated from the chlorine with which it is combined, and unites with oxygen and sulphuric acid to form sulphate of soda. The liberated chlorine combines with the hydrogen of the water contained in the sulphuric acid (the oxygen of which, unites with the soda as above) to form hydrochloric acid, which is collected and preserved, being a product of large industrial value. The sulphate of soda thus formed, is changed into an impure carbonate by pulverizing it, and heating it with pulverized chalk and charcoal.

The carbonate of soda thus formed, is in a very impure condition, containg among other things, unburnt coal. It is purified by a leaching process, similar to that employed for extracting potash from wood ashes, and subsequent evaporation. The details of the above processes vary in different establishments, but the general principle is the same. Other processes have been invented, and although some have promised very well, the process we have described still remains in general favor.

Potash and soda ash are both very largely used in the arts, but owing to the greater cheapness of the soda ash, and its equal utility for many purposes, it has gradually replaced the use of potash, until the latter is greatly reduced. They are used in the manufacture of soap, glass, and other industries, of which we shall have something to say hereafter.

The bicarbonate of potash (saleratus) and bicarbonate of soda (baking soda) are familiar to our housekeepers, but the philosophy of their use in making bread is not perhaps generally understood. In making bread with yeast, carbonic acid gas is generated by fermentation of the dough. This gas expands by heat in baking, and thus the bread is "raised"—that is, its particles are forced apart, and the mass rendered spongy in consistence by the expanding gas. The bicarbonates of potash and soda contain in combination a large amount of carbonic acid, the affinity of which for the alkaline bases is comparatively weak. This affinity can be overcome, and the carbonic acid replaced by lactic acid, the acid generated in the "souring of milk," tartaric acid (cream tartar), acetic acid, and a large number of other acids. Dough compounded with sour milk, and bicarbonate of soda or potassa, will,when heated, be raised by the carbonic acid generated in the decomposition of those salts, lactate of soda being formed and remaining in the bread. When sweet milk is used, cream tartar is added,which also decomposes the carbonates, and liberates the carbonic acid gas; a tartrate of soda or potassa remaining in the bread. So it will be seen that the bread is raised in all cases by the same gas. The "aerated" bread, so called, is raised by first mixing the dough with water and a little salt in very strong iron globes, into which the carbonic acid, generated by the action of sulphuric acid upon the carbonate of lime (usually marble dust), is forced under enormous pressure. The dough containing the gas thus incorporated when baked makes a good light palatable bread, free from the alkaline salts above mentioned, which have been considered, with good reason, more or less injurious to health.

Consider, now, how our subject has led us from the metallic globules imprisoned in their bottle of naphtha, to the bread which the Scriptures so forcibly call the "staff of life."

Gunpowder is about as nearly the opposite of bread in its relations to life as could well be imagined; yet we shall find the globules have also an important office to perform in the manufacture of this death-dealing compound. A most important ingredient of gunpowder is nitrate of potash (niter or saltpeter). This salt is formed by the union of nitric acid with the oxide of potassium. The nitric acid contains, in combination, nitrogen, fourteen parts by weight, and oxygen, forty parts. The oxide of potassium contains nearly forty parts by weight of potassium, and eight of oxygen. Nitrate of potash contains about forty-eight fifty-fourths of its entire weight of oxygen. Gunpowder also contains charcoal and sulphur. We have called your attention to the very powerful affinity of hot carbon for oxygen. Nitrogen is, on the contrary, remarkable for its feeble affinities. Nitrogenous substances are most easily decomposed, and it is because animal substances contain so large an amount of nitrogen that they decay so rapidly, unless decomposition is artificially prevented. When the powerful affinity of the carbon, and the feeble affinity of nitrogen for oxygen are considered, you will not be at a loss to account for the rapid and violent decomposition of gunpowder, when sufficiently heated. But we must remember, also, that the heat which arouses the affinity of the carbon, at the same time weakens the affinities of the substances which form the niter; the latter salt being easily decomposed by heat, without the presence of carbon. The sulphur plays a part in the reaction which we must pass by in this article. The proportions in different gunpowders vary to some extent; we shall give only those of the English and Austrian musket powder. They are: Niter, 75 parts; sulphur, 10 parts; charcoal, 15 parts.

We shall close this article by stating that the salts of all the alkali metals give marked and beautiful colors to the flame of an alcohol lamp, when their vapors are present in it. A common gas flame does not wholly obscure these colors. Tobacco contains nitrate of potash. If a cigar be lighted at or near the edge of a flame of a common bat-wing gas burner a beautiful violet tinge will be imparted to the flame. The violet color is the characteristic color of the heated vapor of potassium salts. Soda imparts to the flame a rich yellow tint. Very minute quantities of these metals can be detected thus; but the flame ought to be as free as possible from the vapors of other substances, as the presence of more than one may easily obscure, or at least modify the tint of the flame, so as to prevent the success of the experiment. The salts of sodium (more particularly the chloride) are to be found almost everywhere. Even the dust floating in the air contains it. Light your alcohol lamp, set it upon your table, and let it stand until the flame is steady. Now drop a book upon the table. Instantly your flame, which was before a very pale blue, emitting very little light, becomes strongly luminous and bright yellow. This is because you have raised a dust, and some of its particles containing chloride of sodium have passed into and have been vaporized by the flame.

The other alkali metals alluded to above, but not described, with the characteristic colors of the vapors of their salts, are, lithium, purplish red; rubidium and cæsium, violet. The simple colored flame test will not distinguish the salts of the two latter from those of potassium; but the lights of the colored flames, when passed through the spectroscope, and thus separated into their elements, exhibit marked differences.

INTERESTING FACTS ABOUT THE HISTORY AND CONSUMPTION OF COAL.

(From the Rondout Courier.)

The present being a season when coal is fast becoming an indispensable commodity in almost every household, and, therefore, constitutes a subject of considerable importance, a brief dissertation under the above caption may not be thought unseasonable.

A distinguished writer, alluding to the introduction of the use of bituminous or flame-burning coal in England, remarks, that the prejudice against it was so strong that the Crown was petitioned to prohibit the "noxious fuel," and a royal proclamation was issued to that effect. This, however, failed to have the desired result; a commission was, therefore, issued to ascertain who burned coal within the city of London and its vicinity, with power to punish them by fine for the first offence, and by demolition of their furnaces if they persisted in transgression. A law was at length passed making it a capital offence to burn coal within the city of London, and only permitting it to be used in the gorges of the neighborhood. Among the records in the Tower, Mr. Astle found a document imparting the fact that, in the time of Edward I., a man had been tried, convicted, and executed for the crime of burning coal in London. It took three centuries to entirely efface this prejudice. Darlington says that "coal was not generally employed as fuel until the beginning of the reign of Charles I. It is, however, mentioned in documents anterior to the reign of Henry III., for that monarch, in the year 1234, renewed a charter granted by his father to the inhabitants of Newcastle, who were permitted to dig for coal upon paying a yearly tax of £100. That fossil fuel had been introduced into London prior to 1306 is proved by the fact that in that year its use was prohibited, from the supposed tendency of its smoke to corruot the atmosphere."

Although bituminous was the only fossil coal used either in Europe or America before the present century, it has been clearly shown by reliable authorities that anthracite or non-flame burning coal, has been known for ages.

Sir F. Pollock, in a case which was tried in 1840, thus alluded to the beds of anthracite coal in South Wales, and the peculiarities of that fuel: "A great many years ago it was ascertained that there were large fields (I hardly know how to use a term capacious enough to give you a notion of the immense tracts of country), which produce a particular species of coal, called stone or anthracite. This is a substance, though called by the name of coal, that differs very much from the ordinary bituminous coal that you are accustomed to see blazing in your grates. The common coal, from whatever place derived, blazes away in a cheerful fire, and breaks up readily; but the anthracite or stone coal, differs both in appearance, structure, and character from common coal. It has a luster which is vitreous and almost metallic; it does not break up easily in pieces, and for many purposes of combustion, is wholly and entirely useless. This coal has been known to exist for centu-

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ries. It was known to be of no use for domestic purposes; it had never been applied to any of the great processes of smelting, although attention had been called to it in various ways; and it was thought that there must be some mode by which so plentiful an article, and apparently so tempting and promising a subject for the philosopher, or for the enterprising manufacturer, could be brought into use."

Such is a brief history of the worthlessness of anthracite coal in Wales, before Crane introduced his hot air blast, for smelting iron, in 1837. Even in this late day it is not used in England for domestic purposes. In America, the first cargo of anthracite coal was sent down the Susquehanna in boats, and reached the United States armory in 1775; but it was not until 1808 that grates were constructed at Wilksbarre, Pa., to burn it for domestic use, under the direction of Judge Bell. The Lehigh Coal Mining Company was formed in 1793, for the development and working of this then improved combustible; but it was not until 1814 that the first twenty tuns were conveyed down the Lehigh and the Delaware rivers, at great cost and labor, to Philadelphia, where a few wagon loads had preceded them from the Schuylkill district in the year 1812. It was as late as 1820 before the comparatively large quantity of 365 tuns of anthracite (average of one tun for each day in the year) reached Philadelphia. In 1825 the product was 6,500 tuns. In the same year the Schuylkill mines were opened, and coal reached the city of New York and other places east.

In the year 1824 the Delaware and Hudson Canal was projected by Maurice Wurts, and its building commenced; and in 1829 it was opened for navigation. Mr. Wurts had an abiding faith that the canal would become a paying institution, and he lived to realize his prediction that the time would come when 500,000 tuns of coal would be floated to tide water in its vessels. We of the present day look with something like contempt upon this quantity as the carrying capacity of the canal, now that its annual tunnage has reached the millions, but then it was looked upon as the exaggeration of a visionary projector. To-day the wildest predictions have been more than realized. It has been the means of giving support to hosts of men, has built up a number of thriving villages along its route, and has given vitality to many otherwise unimportant points.

The company have almost every year increased their business facilities. During the current year, extensive coal fields have been purchased in addition to those already owned by the company, and an immense sum of money appropriated for their development and improvement. With a view to a still greater increase in business, they are now making experiments with a steam canal boat, which bids fair to be a success. Realizing the advantages to accrue from having a live representative at this place, with an eye to the interests of the company, the Hon. Thomas Cornell has been elected one of the directors—than whom no better selection could have been made. The stupendous character of its operations may be imagined when we state that it has thus far this season brought down 1,495,789.1 tuns of coal—an increase of 235,646.13 tuns over last year.

The following figures show the number of tuns of coal brought to tide-water by the canal since its first season in 1829:

1829	7,000	1849	454,240
1830	43,000	1850	432,339
1831	54,000	1851	472,478
1832	84,600	1852	497,839
1833	111,777	1853	494,327
1834	43,700	1854	438,406
1835	90,000	1855	565,460
1836	103,861	1856	499,650
1837	115,387	1857	480,677
1838	78,207	1858	348,789
1839	122,300	1859	591,000
1840	148,470	1860	464,358
1841	192,270	1861	724,160
1842	205,253	1862	604,520
1843	227,605	1863	815,575
1844	251,005	1864	826,939
1845	273,435	1865	748,475
1846	320,000	1866	1,278,882
1847	388,203	1867	1,321,953
1848	437,500	1868 (to Nov. 24th)	1,495,789

Grates were now constructed with vertical front bars, as it was believed that coal would not burn with horizontal openings. Lumps of the size of a person's fist were selected for use; these required so long a time to ignite or kindle fire, that a fire was kept up day and night, to avoid the necessity of rekindling. Egg size sold at a less price than what is now known as "broken." "Nut" and smaller sizes were considered of no value, but deemed mere refuse, and as such, accumulated in large quantities at the yards as well as at the mines. In New York this refuse coal was extensively used toward filling in docks.

In the fall of 1835, a large quantity of this coal having accumulated in West Philadelphia, was purchased and shipped to New York by a gentleman named Jordan L. Mott, of that city, he having invented a grate for burning this fine or refuse coal. This was the first movement that gave a fixed value to the small sizes of coal which, at this day, has become so important an article of consumption. Gen. Harvey, in alluding to this subject says: "Mr. Mott's admirable arrangement for burning small coal caused its speedy introduction for domestic use, and contributed largely to the right appreciation and proper modes of using anthracite for mechanical and other purposes."

The change in the use of coal for wood on board of steamboats took place in 1838, '39, and '40, previous to which time, the upper deck, the space now occupied by splendid saloons, was used for storing wood. After that, anthracite coal went rapidly into use for all purposes requiring fuel, until the annual products of the mines of Pennsylvania exceed ten millions tuns.

A PRACTICAL acquaintance with the hand tool will save the machinist many hours of vexatious labor.

PRACTICAL RECIPES.

WHITEWASH FOR OUTSIDE WORK.—Take of good quicklime half a bushel, slack in the usual manner and add one pound common salt, half a pound of sulphate of zinc (white vitriol), and one gallon of sweet milk. The salt and the white vitriol should be dissolved before they are added, when the whole should be thoroughly mixed with sufficient water to give the proper consistency. The sooner the mixture is then applied the better.

CHAPPED HANDS, ETC.—In this season of cold winds many are suffering from chapped hands, lips, and faces. The following course will scarcely fail to cure, and is almost certain to prevent these inconveniences. Wash the chapped surface with fine soap, and while the soap is on the hands place in the palm a tablespoonful of Indian meal. Before removing the soap, scrub the hands thoroughly with the meal and the soapsuds, then rinse the hands thoroughly with soft tepid water until all trace of the soap is removed, using a little meal each time until the last, which will aid greatly in removing the soap and dirt from the cracks in the cuticle. Finally, wipe the hands very thoroughly and rinse them in enough water to moisten their surface, in which has been poured a quarter of a teaspoonful of pure glycerin, dry them without wiping, using a mild heat, and rubbing them until the water has all evaporated. By this process, the dirt will have been all removed, and in its stead will remain a coating of glycerine. The effect of this application will be apparent by morning, if it be made upon retiring to rest; and whoever tries it once will do it a second time. The glycerin must be pure, however, or it will irritate instead of healing.

TO REVIVE THE COLOR OF BLACK CLOTH.—Take of blue galls, bruised, four ounces; logwood, copperas, iron filings, free from grease, and sumach leaves, each one ounce. Put all but the iron filings and copperas into one quart of good vinegar, and set the vessel containing them in a warm water bath for twenty-four hours, then add the iron filings and copperas and shake occasionally for a week. It should be kept in a well-corked bottle. It may be applied to faded spots with a soft sponge. It is good also to restore the black color of leather when it turns red, the leather being previously well cleaned with soap and water.

TO PREPARE CASKS FOR CIDER.—Cider should never be put into new casks without previously scalding them with water containing salt, or with water in which pomace has been boiled. Beer casks should never be used for cider, or cider casks for beer. Wine and brandy casks will keep cider well, if the tartar adhering to their sides is first carefully scraped off and the casks be well scalded. Burning a little sulphur in a cask will effectually remove must.

TO MAKE A PURE CARAMEL.—The commercial caramel is a solution of burnt sugar in water. It is rarely pure, often containing undecomposed sugar and bitter compounds generated during the heating process. To purify its solution, it should be filtered and alcohol added until no precipitate is thrown down. The precipitate is a dark brown powder, in many instances almost black, and is pure caramel, soluble in water, but insoluble in alcohol.

TO FILL HOLES IN IRON CASTINGS.—Sulphur one part, salammoniac two parts, powdered iron turnings eighty parts, make into a thick paste with water immediately before using. The materials should also be kept separate until the time they are wanted.

A NEW TOY FOR YOUNG AND OLD.

Probably there is not one of the readers of the SCIENTIFIC AMERICAN who has not derived amusement from the spinning of tops; and the variety of their forms and performances is so great that we might have supposed the field of invention had been fully cultivated and reaped; but after seeing the old toy adapted to exhibit mechanical and optical effects, we expect still further advance in "top dressing"—to continue our figure of cultivation.

The Japanese have latterly astonished us with their performances in the top department, but we think they have not exhausted the powers of entertainment from top-spinning, judging after the novel exhibition we have witnessed, by one of our old correspondents, whose signature to several articles on amateur turning some of our subscribers will recognize.

He has penned a description of the top he employs, on which, after perusal, any of our young amateur friends may exercise their ingenuity in imitating. We promise that they will not only be interested but entertained; and as the inventor declines to take out a patent, and prefers to offer its free construction to our friends in the toy manufacture, we ask a careful examination of his device, statement, and explanation.

A Huge Mud Digger.

An Eastern exchange says: The largest mud excavator in the United States has just been completed in Portland for a Boston party to be used in excavating the South Boston flats. The digger is eighty feet long and forty feet wide. It has double dredger with twenty-nine large iron buckets on each elevator. The elevators are placed on the sides of the scow and can be worked singly or together. Its operation is as follows: Two large scows are anchored ahead and astern of the digger, about 200 feet apart. These scows are secured by timbers that are driven into the mud, and raised, when necessary, by machinery. Two chains run through the digger and are attached to the anchored scows. When the engines are in operation they move a shovel, which is held in position under the dredger by an arm, one of these shovels being attached to the lower end of each elevator. As the dredger moves along between the two anchored scows, the shovels stir up the mud and the buckets on the elevator scoop it up and deposit it in a scow secured to the forward part of the dredge. The elevator runs by two engines, with cylinders six by eight inches, acting independent of each other. There are two main engines for running the machinery and moving the dredger, with cylinders fourteen by twenty inches.

The Tea Trade in New York.

A correspondent of the Troy (N. Y.) *Times* gives some interesting facts in regard to the tea trade of this metropolis, some of which we referred to on page 122 of No. 8, current volume, SCIENTIFIC AMERICAN. He says:

There are a few places where we are wont to drop in and take a cup of tea, which to a wanderer in this great labyrinth is very acceptable. We do not refer to the restaurants, which are very well if one can do no better, but to the tea brokers in Wall street and that vicinity. These gentlemen always have some extra qualities on hand, and the kettle is never off the boil; and here one can brew a cup of gunpowder, young or old hyson, or breakfast tea in a minute by the watch. Formerly teas were sold at auction, and in this way a cargo of ten thousand chests could be disposed of in an hour. The great center of the tea trade was then the Phenix salesroom, in the *Journal of Commerce* building, for which a rent of $40 was exacted for each sale. The sample chests were placed on examination one day previous, and each chest was numbered and then tapped with an auger for sampling, while a pile of catalogues lay on the desk. On some occasions over two hundred sample chests might be found, and it was no small task for a grocer to examine this array of different qualities in a single day. But it had to be done, and hence the room would be crowded, each man chewing and smelling, and in every possible way reaching an estimate of value which he penciled on his catalogue so as to be prepared to bid. Some dealers took the liberty to send boys for samples which they tested in their own offices, the samples becoming the perquisites of the clerks, and sometimes amounting to a large value. The floor of the salesroom would be covered with tea dust and the general waste of the article would be very great, averaging six hundred pounds at each auction. The purchase of tea under such circumstances was a great trial of skill, the bidding being for the first choice out of ten lots, and each subsequent choice being put up until the whole was disposed of. Some having got the bid would choose a lot whose inferiority would at once attest their ignorance and call forth a general smile of ridicule.

The autioneer on these occasions was almost invariably the late Lindley M. Hoffman, whose eloquence on the stand was only equaled by his grace of action. He was a small man, full of motion, which, in his case, was like the performance of an acrobat. At one time he would be on one leg, at another both arms would be over his head, while his whole body would be convulsed with excitement. He had a marvelous memory of name and face, and amid a hundred voices would discover the first claimant. We have seldom been more rapt by any oratory than by his magic performance, and we can understand the full meaning of that man who said he would rather hear Hoffman sell a cargo of teas than attend the best opera.

With the death of Hoffman, tea auctions went out of use and the present fashion of brokerage commenced, with which importers are generally better pleased. They save the waste, which is at least equal to five hundred dollars on each sale, while the auctioneer's fee and rent of salesroom are two hundred dollars additional. There are about a half-dozen tea brokers here, and all tea imported into this city, with a very few exceptions, passes through their hands. Their offices contain hundreds of samples placed in the boxes, and they can in an instant show a purchaser the grade he may require. This is tested by making a cup of tea, the drawing being invariably of the weight of a five cent silver coin, which always rests on the tiny scale. Tea tasting is exceeding hard on the nervous system, and while it may be very pleasant for us to drop in and take a casual drink, it is a very different thing to taste a hundred samples in a day. No one who has not a very enduring constitution can long maintain this continual stimulus. One of the best tea tasters in America is a nervous, timid man, who should have been very rich, but he is not, and never will be He deals in the article, but in such a small way that it does not amount to a success. Had he possessed nerve to operate boldly, he might have been a millionaire; but as it is, after thirty years of trade, but little removed from the foot of the ladder. He has a rare gift, but it has been of little use.

Tea, when sold by an importer, is always weighed by a city weigher, who receives a fee for each package. The fees on a cargo amount to about $200. Down weight being always given, the jobber generally can gain a pound on reweighing it. As a rule, a cargo of tea stored for one year will gain enough by absorbing moisture to pay the interest on the capital. Hence some importers make a rule to sell no tea until it has been stored a year. We have known teas held in New York five years and then sold for nearly half less than had twice been offered for them.

Every cargo will be more or less damaged by water, and these teas are sold at auction by the underwriters. They are bought by parties to re-manufacture, which is done by coloring them with Paris green and drying them in maltkilns. They are retailed at what are called "cheap stores," where the poorest class do their trading, and where damaged goods generally find a market. We well remember the wrecking of an Indiaman off the Jersey coast, part of whose cargo was brought up reeking with salt water, and the chests were knocked to pieces and emptied on a large sail which had been spread in the street. Here we saw a mass of tea forty feet square and a foot deep, which brought about five cents per pound, and was not worth even that petty sum. Bad as it was somebody used it. The restoration of damaged tea is now a regular business, in which a number of men find employment, and thus live by poisoning others.

OBITUARY---DR. WARREN ROWELL.

We regret to be compelled to note the death of DR. WARREN ROWELL, which occurred on the 2d of December. DR. ROWELL was an occasional contributor to our columns, his articles proving his ability to deal with practically scientific subjects, especially those affecting mechanics. A man of positive opinions, formed always by observation, experiment, or experience, his instructions were valuable to those who lacked his opportunities or talents. We shall miss his genial companionship and his ready criticisms, which were always tempered with reason and defended with ability.

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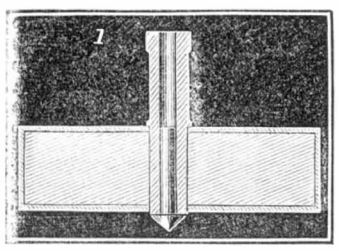
THE LENOX TOP.

This top, so named from its birthplace, Lenox, Mass., is offered without any patent or royalty, to the attention of amateur and professional manufacturers, and rests its claims for priority over all other tops on the following five combinations:

1st, It spins for a great length of time, say half an hour or more. 2d, It gives motion to other objects, during its rotation; thus making marbles, money, or China dolls, spin round it, acting as satellites. 3d, It gives motion to paper tubes, ornamented by colored and gilt papers, silk, ribbons, etc. These, when rotating on a loose spindle inserted into the stem of the top, appear like Venetian glass goblets. Also, when the spindles are made of wire and bent, the rotation gives to the wires the appearance of vases, etc. 4th, It produces a change of appearance in spiral rings, painted on circular cards, by forming circles of great beauty. 5th, It acts as the carrier of another top, on its shoulders, like Sinbad the Sailor; both tops revolving at the same time.



To effect these five objects, the same form of top and handle to spin it are employed, but the tops are of different sizes, and weights. The top is spun on a China plate or shallow saucer, which inclines to the center. The ordinary plate will answer for all the combinations, No. 1, 3, 4, and 5, but for No. 2, a larger plate, with a gradual slope or incline from the rim to the center of the plate, is absolutely essential; as the rotation of the marbles, dolls, etc., depends on the centrifugal force communicated by the top in the center of the plate, during its revolutions, to the marbles, etc., which slide down the inclined plane, and receive a rotary impulse from the central top, until its forces are entirely exhausted.

The China plate may be of 8, 9, or 10 inches, inside diameter, of hard enamel to prevent holes from being drilled into it by the steel point, and the plate should have a drop of olive oil rubbed on it to prevent the same injury. The larger the plate, the heavier you can make the top, and the longer it will keep the satellites in motion.

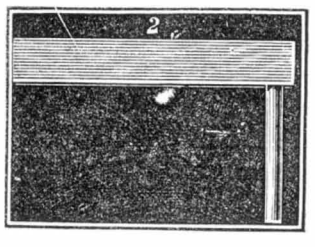
The edge of the top, which communicates motion to the marbles, etc., may be made rough, but it is better to slip on it an india-rubber band, which acts perfectly.

The top can be made of a thick disk of metal, with a hole drilled through the center; a tube is fastened into this hole leaving three quarters of an inch of the tube projecting above the disk on its upper side, and level with the bottom of the disk on the lower side. Into the bottom of the tube, insert a short piece of steel wire, having a point on the end, projecting about one quarter inch. This constitutes the whole of the top.

The handle is a piece of wood, which can be grasped in the left hand, and a steel wire passes at right angles through the end of the piece of wood. The wire must be of the size of the hole in the tube; and when inserted and held perpendicularly, the top will stand upright on the plate, and if a string has been wound around the upper projecting part of the tube, and drawn first slowly, and then quickly by the right hand you set the top in rapid motion. The steel wire must not be pressed too strongly against the inside head of the steel point, nor should it be withdrawn before the string is wound off, and the top has acquired a steady motion.

The handle will be held more firmly, if the thumb clasps the steel wire, while the wooden handle is grasped in the hand.

Various other ways of making tops will answer the purposes intended, but this top and handle are of extremely simple construction; any amateur can make it, and the time it will rotate, is greater than any top I ever tried.



Strength and dexterity in the art of spinning and the length and fineness of the cord, influence the time the top will remain up. With a silk braided fishing line, six feet long, wound three times up and down the stem, I succeeded in making a top weighing ten ounces revolve for thirty-five minutes, on a plate; and I do not consider a top well made, that cannot keep up twenty-five minutes at least.

As amateurs may like to know how to make such a top without the aid of the founder, I will describe the process I adopted for making one of the tops, I send with this.

I cut two thin brass plates with shears, into squares, drilled holes in the center to fit a piece of brass tube tightly. I then turned these pieces of sheet brass round the size of the top, by means of a screw chuck and nut.

The piece of brass tube, and one side of each of the sheet brass disks, was tinned with muriate of zinc, tin, and an alcohol lamp.

One of the disks was placed firmly and truly, on the brass tube, three quarters of an inch from the end of it. A piece of card paper was wound around the disk to form a cup or mold about one half an inch deep and fastened by a wire twisted around it. I then melted lead and old type metal, half and half, in a ladle and poured it into the card mold. The heat of the boiling fluid melted the tin on the brass sheet disk, without burning the surrounding card, and when cold the disk and tube were fastened firmly together by the melted material.

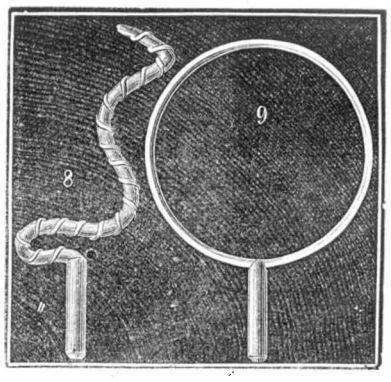
I now put the end of the tube into a chuck, turned off the face of the metal, leaving the tube on that end projecting one eighth of an inch and turned the side true. The top now was finished with the exception of the brass disk at the bottom, which after heating the top moderately over the alcohol lamp, and applying some solder made of tin and bismuth, was placed on the projecting end of the tube and pressed until cold. I then turned a steel point, and hammered it into the end of the tube; put the top again on the lathe held by the long projecting stem, turned the steel point true to the center, and it was completed with the exception of polishing the two brass plates with fine emery paper and rottenstone. The brass plates, I also ornamented with a slate pencil dipped in water, forming circles on them by the hand; and after applying a little heat, varnished them with French copal varnish.

The whole top can be made accurately, without a slide rest. Of course, such tops can be made more cheaply by dies, or by the brass spinning process. This would be requisite for wholesale manufacture.

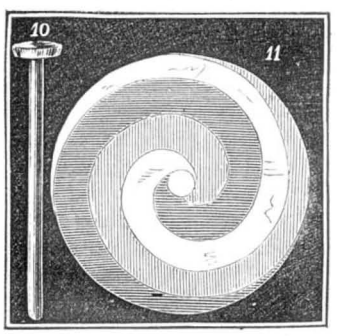
Having described the top and handle, way of spinning it, and making a top, I will describe its performance. Let me state the way in which this very amusing toy was suggested to me. I made a pair of wooden tops, or "Jennie Spinners," which you spin between the thumb and forefinger. They were made to show some young ladies the action of a lathe. After spinning one on a plate, the other was set in motion. The plate had a dip or incline to the center, and the first jennie spinner lay motionless. The second one naturally slid to the center of the plate, and, coming in contact with the first one, set it in motion a second time by friction. Following up this suggestion, I made heavy metal tops for the first motor, and, for the satellites, small saucers, which could hold dolls, etc., and which would slide down and reach the first motor. The beauty of the toy cannot be appreciated without seeing the curves and rotary movement of the waltzing dolls and circulating money, etc. These will revolve for several minutes.

Centrifugal force, gravitation, and friction, are extremely well illustrated by this toy, beside the pleasure afforded in making the top spin, and seeing the satellites revolve. The third object of the top is to illustrate the well known fact of persistency of vision. The eye retains an image impressed on it after the object which it represented has gone. This combination was suggested by a friend placing a piece of twisted paper into the tube, whilst the top was revolving. He exclaimed, Look at my champagne glass! The hint was not lost, although I had not heard, at that time, of a toy which by a crank and wheel produced similar effects. I have not seen the toy, but it must be more complicated and expensive, and cannot afford the same pleasure to the operator. If a tube of paper, which exactly fits the upright tube, should be inserted in the stem of the top when in motion, it would only appear like a straight mast in a boat; but if the tube of paper is smaller than the hole in the stem, the upper end of the tube will lean, and as the top revolves, will show a cone. Tubes of paper are a light material, and if a wire is inserted in the lower part of the tube, and the wire is then placed in the upper stem of the top, it will keep the paper stiff, and yet give the requisite lean or wabble, to the upper end of the paper tube. Rapid rotation will leave the impression on the retina of the eye, of a wine-glass in motion.

When these tubes are colored, by painting them, or winding strips of colored or gilt paper, strung beads, etc., round them, either in rings or spirally, the effect is greatly heightened, and the revolving tubes have the appearance of the most delicate Venetian glass goblets. These tubes can be made by any young lady with note paper, a little paste, and a thin glass tube to roll them on. A glass tube is much better than wire, or wood, as it is withdrawn readily after the tube is formed. The tube is left to dry, and when dry, is printed or covered by colored strips of paper, silks, ribbons, gilt stripes, etc., according to the taste of the lady. I have more than one hundred of such tubes of every variety of color and material. Feathers, beads, loops of floss silk, &c., will suggest themselves to the maker, without any limit or more particular directions. In order to make these tubes appear more like wine goblets, a card is cut round, pierced with a small hole for the wire to pass through, and painted with colors to match the tubes. This is also a lady's pastime, and very easily done. Or, a number of colored pieces of paper, can be strung on a small screw and nut chuck on a lathe, and then rings of different sizes can be cut with a sharp chisel, thus furnishing a diversity of colored papers to paste on to the round cards, according to the taste of the lady. But a much greater effect can be produced, by taking annealed iron or brass wire, and shaping it with plyers so as to obtain the profile of goblets, jars, vases, etc; and then by covering these with bright colors, and placing the stems in the tube of a larger revolving top, most beautiful effects are produced. This is also, the handiwork of a lady, and when a heavy top weighing sixteen or twenty ounces, is used, the vases are kept steady and spin for a very long time. Nothing can be more fairy-like than these revolving spectral vases, seen by gas or a lamp at night. Although these optical effects may be produced in day light, when the operator or spectator has his back to the strong light of a single window, and places the top and vase before him, in a direct line with the eye, and has for back ground some dark object; yet, it is far more effective by gaslight, or the light of a kerosene lamp, depressed so as to throw all the light on the plate. The effect is then extremely beautiful. Another optical illusion of a very charming appearance, is produced by painting spirals in colors or cards, which have a small hole in the centre, through which a wire is passed of about two inches in length. This wire has on the uppermost end a small button, which prevents the round card from flying off while revolving. The card and wire are made to rotate, when the top is in motion, by the insertion of the wire in the top, as previously described, and then by raising or depressing the card on the wire by two other wires held one in each hand of the operator. The spirals are converted into brilliant rings, which change places, and melt into each other, as the card is depressed or raised by the two hands, in a most charming way.



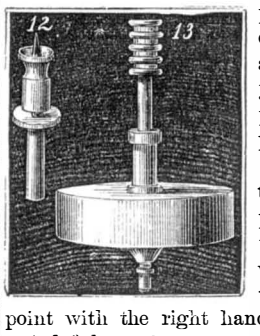
Sinbad's "Old Man of the Sea," is represented by a different top, which I call the Japanese Needle Top, made like a gyroscope top, but with a small hole in the end of the stem or spindle, to allow it to spin on a needle point. The body of this top is pierced, and like a carriage wheel, revolves on the spindle like the carriage on the axle tree, but when placed upright on its spinning point, the wheel presses on the washer near the end of the spindle, and its friction against the washer is so great, that the spindle revolves with the wheel, and becomes as rigid as if the two were soldered together. Seize, however, the upper end of the spindle, between the thumb and fingers, and then the wheel continues its revolutions by itself alone, and the spindle remains again stationary, and allows you to place it on another plate, when it again revolves with the wheel, until all the centrifugal force is expended.



This is the Japanese plan of making tops, a thousand years old, but by no means the best plan of spinning a top, if you want it to keep up a great length of time. It is, however, a very important feature of a top which requires to be moved around during its rotations, and it enables you to lift it up, and place the spinning end in a cup, attached to the upper end of another top, during the revolutions of the latter, and also, if a small hole be drilled in the point of the spindle, to place it on the point of a needle and let it spin there. The needle can be held between the fingers, or stuck into the cork of a bottle, or it can be inserted into the end of the other top.

In all these cases, which are very pretty illustrations of Japanese top spinning, the friction is so small that a top will revolve twenty minutes, or even longer, on the point of the needle.

To place the spindle on the needle requires a steady hand and sharp eye. The practice is best acquired by having the needle fixed firmly in some substance, and the top placed on the needle point, before pulling the string and by holding it pressed against the needle point during the drawing of the string, and then allowing it to rotate. If you spin it on a plate, lift it up, and place it on a needle, a great deal of power is expended uselessly.



I generally wind the string, hold the spindle in the right hand, and pull the string with the left; the wheel of the top is kept either in a vertical or horizontal position, and then I place the top on the needle point with the right hand.

A left-handed person would reverse the order. You can readily place the needle top on the needle, held in the upper stem of the revolving Lenox top by a very simple contrivance; a guiding tube with a funnel-shaped end slips on the needle and it can be held stationary (while the needle itself is revolving) by the fingers of the left hand. The guide is held a little above the point of the needle, and the needle top, when rotating, is placed in the funnel, which carries it safely on to the needle point, and then the right hand releases the spindle of the needle top. The guiding tube drops down, and both tops revolve, unequally at first, but soon in unison. The expert hand can make one top revolve to the right, while the other top revolves the contrary direction. The needle can be fastened true and firm into a brass wire which is turned true so as to fit into the hole in the upper stem of the Lenox top; a large needle or pointed wire is the best to employ, as small needles bend and break easily.

The string in all tops should be fine, strong, and as long as the arm of the operator can draw it. A braided or twisted silk line is the best.

The plates should be strong, with an inclination to the center. A common coarse French saucer answers very well, and if the needle top falls, is not so readily broken; beside, it does not cost as much to repair the breakage. The enamel of

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the plate should be very hard to prevent the point of the heavy top from drilling a hole in it. The direction to spin the Japanese needle top is to hold the fly wheel and end of string between the thumb and forefinger of left hand, wind the string around the neck of the wheel with the right hand. Now take the spindle between the thumb and forefingers of the right hand, and loosen the hold with the left hand, take the end of the string in it, pull leisurely at first and then faster until all the string is unwound, and the top rotates briskly.

Fig. 1 is the vertical section of the top of the disk of heavy metal, as lead or type metal, the stem a brass tube, the top and bottom of the top of sheet brass, the whole being soldered together, and a steel point being secured in the lower end of the brass tube. The upward projection tube is for receiving the spinning string.

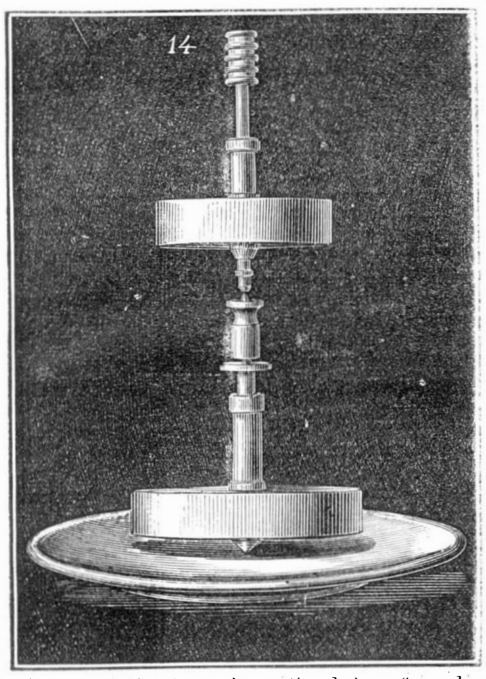

Fig. 2 is the handle, the main portion being of wood and the projection a steel wire.

Figs. 3, 4, and 5, show the various styles of amusement that may be obtained from this simple top. In one case a coin may be made to rotate, or a doll to waltz, or a bead to gyrate.

The paper tubes and bent wire experiments are shown in Figs. 6, 7, 8, and 9, fully explained in the body of the description.

Figs. 10 and 11 are the spiral card experiments; 12 and 13 the Japanese needle top amusements, and Fig. 14 Sinbad the Sailor and the Old Man of the Sea. E. J. W.

Lenox, Mass.

CUNNINGHAM'S PATENT MORTISING AUGER.

The peculiarity in this auger consists in forming the twist or helical portion into a number of chisel-shaped lips rising from the edge of the twist and presenting sharp edges in the direction of the bore of the auger, so that the wood may be cut laterally if pushed against the instrument after the hole has been bored to a sufficient depth for the proposed mortise or slot. The end lips may be made chisel-shaped or hollow like a gouge, as desired. If the auger or bit is held in the rapidly revolving arbor of a mortising or boring machine the mortise may be cut at full depth at one operation, by moving the wood laterally against the auger. This auger will cut either with or across the grain, and the mortise or slot may be made of a greater diameter than that of the auger if required. The number of these cutting lips or rotating chisels is sufficient to insure a perfect cut the whole length of the twisted portion of the auger, even if one or more of the bits should be broken. In the one represented in the engraving, five of these lips are contained in one revolution or circumference of the auger, and where the upper lip of one ends the lower edge of the succeeding one. If the mortise cut by the auger is required to have square corners, of course they will be chiseled as usual.

The chisel edges insure a perfectly smooth hole for ordinary boring and the breaks between the edges allow a larger space and easier clearance for chips than the ordinary auger.

Patented through the Scientific American Patent Agency, September 1, 1868, by Peter Cunningham, who may be addressed for the purchase of territorial or manufacturing rights at Eckley, Luzerne County, Pa.

A Horse in Battle.

Kinglake, in his "History of the Crimean Invasion," gives the following graphic description of a horse in battle:

"The extent to which a charger can apprehend the perils of a battle-field may be easily underrated by one who confines his observation to horses still carrying their riders; for as long as a troop-horse in action feels the weight and hand of a master his deep trust in man keeps him seemingly free from great terror, and he goes through the fight, unless wounded, as though it were a field day at home; but the moment that death or a disabling wound deprives him of his rider, he seems all at once to learn what a battle is—to perceive its real dangers with the clearness of a human being, and to be agonized with horror of the fate he may incur for want of a hand to guide him. Careless of the mere thunders of guns, he shows plainly enough that he more or less knows the dread accent that is used by missiles of war while cutting their way through the air, for as often as these sounds disclose to him the near passage of bullet or round-shot he shrinks and cringes. His eyeballs protrude. Wild with fright, he still does not commonly gallop home into camp. His instinct seems rather to tell him that what safety, if any, there is for him, must be found in the ranks; and he rushes at the first squadron he can find, urging piteously, yet with violence, that he too by right is a troop-horse—that he too is willing to charge, but not to be left behind—that he must and he will 'fall in.'"

This almost equals the superb description of the war-horse in Job.

PICKERING'S VELOCIPEDE.

The velocipede seems destined to come into use in this country—though perhaps not soon to the extent that it has in France. It is so attractive and fascinating, developing so much strength and skill, and affording so great amusement to the rider, that its votaries and students will be numerous.

Of the various kinds, four, three, and two wheeled, the latter is the only artistic one, and except for unusual occasions, we would say never has the driving wheel more than three feet diameter; for ordinary use 33 inches is a good size, while for boys we would say 28 to 30 inches.

At first sight one would suppose it to be a formidable undertaking to mount and steer one of these two wheeled articles, but a few hours practice, causes the student to feel quite master of the ceremonies.

The velocipede which we illustrate this week has been designed by T. R. Pickering, of this city, and made by Pickering and Davis, 144 Greene street, and differs materially from the French in many points; it is more simple and durable, lighter, stronger, and cheaper. The reach or frame is made of hydraulic tubing. Pickering's is made by gage, just as sewing machines, Waltham watches, and Springfield muskets are made, so that when any part wears out or is broken, it may be replaced at an hour's notice. Its bearings are of composition or gun metal, and the reach or frame is tubular, giving both lightness and strength. The hub of the hind wheel is bushed with metal, and the axle constitutes its own oil box. It differs from the French *veloce* in the arrangement of the tiller, which is brought well back, and is sufficiently high to allow of a perfectly upright position in riding. The stirrups or crank pedals are three sided, with circular flanges at each end; and as they are fitted to turn on the crank pins, the pressure of the foot will always bring one of the three sides into proper position. They are so shaped as to allow of the use of the fore part of the foot, bringing the ankle joint in play, relieving the knee, and rendering propulsion much easier than when the shank of the foot alone is used as in propelling the French vehicle. The connecting apparatus differs from that of the French bycycle in that the saddle bar serves only as a seat and a brake, and is not attached to the rear wheel. By a simple pressure forward against the tiller, and a backward pressure against the tail of the saddle, the saddle-spring is compressed, and the brake attached to it brought firmly down upon the wheel.

A Singular Case of Supposed Lunacy.

A most singular circumstance has recently occurred in Louisville. One Robert Sadler being arraigned on a writ of *lunatico inquirendo*, the following appeared in testimony: It was allegated that in the nighttime he would alarm his family and his neighbors with screams as if in severe pain, exclaiming that he felt the pain inflicted upon persons at a distance, by amputation or other causes. Mr. Sadler was said to be of good character and incapable of wilfully feigning what he did not feel, and therefore was supposed by his friends to be insane. In consequence of this belief a writ was issued to make the proper legal inquiry and to decide the question. The jury however could not agree to call him insane and he was discharged. It was proved that he uttered his cries and expressions of pain at the precise time that those with whose sufferings he claimed to be in sympathy, were actually undergoing the operations, which would cause similar pain; and this under circumstances which precluded the belief that he could have been aware, by external means, of the time or place at which such operations were to take place. The length of time during which he had displayed this morbid sensibility had been so prolonged, that if he had really been practicing a deception it could scarcely have failed to be discovered. In his conversation, and in all other particulars except the one we have described, Mr. Sadler gave no evidence of anything except the most perfect sanity. The case seems to be well authenticated, and if the truth of the details can be relied upon is altogether a very remarkable one. It resembles very nearly, in its prominent features, the characteristics of the so-called cases of bewitchment which occurred in the earlier history of New England. It is not impossible that a recurrence of that physical affection, for such it undoubtedly was, may again recur, though it is quite impossible that its treatment would be so irrational in the present age as in the past. There is more we believe in the nervous system of mankind than has been even dreamed of in our philosophy, and such cases as the above carefully studied might be useful in throwing light upon mysteries hitherto unexplained and inexplicable.

PROTECTION OF SHEEP FROM DOGS.

It would be a work of supererogation—much more than duty requires—to say anything in praise of dogs, their sagacity, fidelity, generosity, unselfishness, courage, etc., as everybody acknowledges that some specimens possess these virtues in a remarkable degree. But we question whether their characteristics might not be summed up in the same manner that our school Olney's Geography used to designate the character of the people of different countries; thus, "The Lapps are ignorant, superstitious, vindictive, surly, and filthy in their persons; but affectionate, docile, hospitable, and faithful." While the dog—or some of his race—may be all that his lovers say, is he not also cruel, malicious, treacherous, a thief and a robber, a murderer and a slayer? Yea, a slayer for the pleasure of slaying. It is unpleasant to believe so, but the delight some dogs have in worrying innocent kittens and in teazing motherly tabbies does not speak well for their generosity or courage. Neither does the fact that one dog will kill a dozen or twenty sheep in a single night when, even if hungry, he could not eat half a one, induce a strong belief in his unselfish virtues.

Not less than half a million of sheep are killed annually and as many more permanently injured by dogs within the limits of the United States. It may seriously be questioned whether all the virtues of the canine race aggregated is worth as much as these one million sheep. Still, as hunters and guardians of property dogs are not to be despised. Cannot some simple means be devised for protecting sheep from these domestic wolves short of exterminating the canines?

A writer in one of our agricultural exchanges says that cattle, and more particularly cows with young calves, are a sure protection to sheep from the attacks of dogs and wild animals, and cites several notable cases in point, enough to establish the fact. But another writes thus:

"I have found sheep do very well among cattle, but cattle do badly among sheep. To prove it, let the farmer take the fodder left by the cattle, even when part of it has been trodden under feet, and if the sheep are not fully fed, he will see the sheep eat it very greedily; then let him take what his sheep leave and offer it to his cattle and he will find they won't eat it if they can get anything else; or, let him turn his milch cows into a sheep pasture and he will find them to fail in milk."

In this dilemma it is questionable whether it is better to have less milk and more mutton, or *vice versa*.

Original Letter from Robert Fulton.

The following letter was addressed by Robert Fulton to Andrew Brink, the Captain of the *Clermont*, the first steamboat of the Hudson river. The original letter is in possession of Persen Brink, of the town of Saugerties, Ulster county, and a copy of it was sent to the Kingston *Argus* for publication:

"NEW YORK, October 9, 1807.

"Captain Brink—Sir: Inclosed is the number of voyages which it is intended the boat should run this season. You may have them published in the Albany papers. As she is strongly made, and every one, except Jackson, under your command, you must insist on each one doing his duty, or turn him on shore and put another in his place. Everything must be kept in order—everything in its place, and all parts of the boat scoured and clean. It is not sufficient to tell men to do a thing, but stand over them and make them do it. One pair of good and quick eyes is worth six pair of hands in a commander. If the boat is dirty or out of order, the fault should be yours. Let no man be idle when there is the least thing to do, and make them move quickly.

"Run no risque of any kind; when you meet or overtake vessels beating or crossing your way, always run under their stern, if there be the least doubt that you cannot clear their head by 50 yards or more.

"Give the amount of receipts and expenses every week to the Chancellor.

"Your most obedient,
"ROBERT FULTON."

TRIAL OF VELOCIPEDES.—On Saturday, the 28th of November, a trial of velocipedes took place in this city, at the armory of the 22d Regiment in Fourteenth street. Four different makers were represented. Two of the velocipedes were of the French style, high and awkward to mount. The one generally conceeded to be the best was an American design, embracing several improvements upon the French machine. Various adroit manipulations of these machines were performed by the exhibitors. Among the most notable of these was one in which they all took part, to show the applicability of these vehicles to military service.

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JAPAN---ABSTRACT OF A LECTURE BY THE HON. GEORGE H. FISHER.

Reported for the Scientific American.

One of the most interesting and instructive popular lectures of the season was recently delivered in this city, by the Hon. Geo. H. Fisher, late United States Consul to Japan, to a large and appreciative audience. We give the following abstract:

The lecturer, after briefly alluding to the early treaties between the United States and Japan, proceeded to correct certain false reports and impressions prevalent in relation to the affairs of that country. The origin of these false reports and impressions was traced to a diplomacy, which he asserted, had done its utmost to retard civilization in that remarkable country, and to prevent the diffusion of accurate information in regard to it. The present Tycoon was described as a man of honor and good sense, but the lecturer maintained that the monopoly of the three ports now open is calculated to foster unfriendly feeling. The prejudice which has hitherto existed against foreigners is gradually yielding. Although nothing like the caste peculiar to India is known in Japan, still there are insurmountable obstacles to the mingling of the higher and lower classes. A mark of rank is the wearing of two swords. The right to do this, although hereditary, may be made the subject of purchase. The women also wear a kind of sword or dagger which is rarely used. The power of money in Japan was stated to be very great, even to the purchasing of the performance of enormous crimes; but we are sure the lecturer did not mean to be understood that Japan was exceptional in that respect. The laws of the land are entirely traditionary and lawyers are not known there. The lash is the most frequent punishment for inferior crimes and misdemeanors; banishment to an island in the vicinity is a common punishment for higher crimes. The people are hospitable and friendly. They wash their persons but not their clothing. The fashions are always the same. Adults are not unfrequently met with in the streets perfectly naked. Their food is chiefly vegetable. Their physical strength is very great. Their temples of worship are extremely beautiful, and their surrounding grounds are carefully kept and supplied with beautiful trees and flowers. The Holy Mountain of Japan is worshipped as the gate of heaven, and many make pilgrimages to it, ascending its sides in robes of pure white. Although considering Japan as a grand field for missionary effort, the speaker though it not advisable to attempt much at the present time.

In speaking of their mechanical ability, the lecturer styled the Japanese the "Yellow Yankees of the East" on account of their skill and taste in arts and manufactures. They are accomplished diplomatists, and are sharp and shrewd in bargaining. The women are slaves to the men. Those who are unmarried are very handsome having most beautiful hair and teeth. As soon as they are married, however, they blacken their teeth and shave their heads, which renders them hideous. Parents are fond of their children. Loafers are unknown. All classes use tobacco and spirits but do not use opium. People pay their debts annually. The Japanese are familiar with, and masters of the steam engine; differing greatly in this respect from their neighbors, the Chinese. The lowest classes are the coolies and tanners.

They are perfect masters of the art of engraving and drawing on wood, and their printing is beautiful and accurate. They do not, however, use movable types. Every Japanese can write his name. They work with hands and toes simultaneously. Their cemeteries excel in beauty, as do the tombs they comprise.

Mr. Fisher stated that machine shops and manufactories are being erected by the Government, and closed his lecture with a prediction that Japan would in the future become a powerful, free, intelligent, and Christian nation.

The Iron Works of Chicago--Fifteen Thousand Men Employed--A Business of $25,000,000 a Year.

The Chicago *Times* publishes a very long and elaborate descriptive article showing the extent of the iron business, and giving the name and size of, and the amount of capital and labor employed, and work turned out by, each of the foundries and workshops in that city. From this article the following interesting facts and figures are taken:

The iron interest of Chicago employs fifteen thousand men, to whom is paid the yearly sum of $12,000,000 for their labor: $15,000,000 is invested in the manufactory of iron, which does a business of about $25,000,000 per annum. The number of iron establishments in the city amounts to one hundred, which are engaged in the manufacture of boilers, cutlery, derricks, engines, farm implements, gages, gearing, lathes, lightning rods, mining machinery, needles, nails, ordnance, plate and pig iron, quadrants, ranges, stoves, tanks, utensils of all kinds, size and value.

The "Eagle Works" are situated in the west side of the city, and their different buildings occupy different sites on five streets, 370 feet on Clinton street, 150 feet on Madison street, 300 on Washington street, 168 on West Water, and 210 on Canal. The principal articles manufactured in these works are engines, boilers, flouring mills, gang mills, circular sawmills, stamp mills, ore and rock crushers, and general running machinery. This establishment employs in the neighborhood of one thousand men, whose annual pay-roll exceeds $300,000. The estimated value of the property, including machinery and buildings, is $500,000.

The "Northwestern Manufacturing Company's Works" are run upon the co-operative system, and with a capital of $450,000, employ 375 men, and do a business of about $700,000 per annum. This establishment has also a branch called the "Northwestern Pipe Works," which has a capital of $50,000, and employs 35 men.

The "Barnum and Richardson Manufacturing Company" make castings and car wheels. Their works cover more than an acre of ground. They employ 75 men, have a capital of $150,000, and do an average yearly business of $400,000.

"McCormick's Reaper and Mower Works," is perhaps the most interesting manufacturing establishment in Chicago. The buildings cover an area of 400 by 500 feet, in the business center of the city. The business began here in 1846, twenty-two years ago, and since that time 100,000 harvesting machines have been manufactured in these works. Fifteen years ago 1,000 machines per annum were considered a big undertaking, and predictions were then made that at that rate the country would soon be over-supplied. But now 10,000 machines per year do not begin to supply the demand, which is greatly increasing, and now already overmatches the capacity of the works. 500 men are constantly employed.

Each machine contains not less than 1,000 separate pieces of wood, iron, steel, brass, copper, tin, and zinc, making the enormous number of 10,000,000 pieces which have to be made, counted, assorted, inspected, classified, packed, and shipped in one year's business.

The following is the amount of raw material worked up in this establishment during the year: Lumber, 25,000,000 feet; pig iron, 3,000 tuns; bar iron, 1,500 tuns; paints, 100,000 pounds; oils, 5,000 gallons; zinc, 125,000 pounds; steel and other metals, 150,000 pounds, and 2,000 tuns of coal. The item of scrap lumber, the cuttings left after sawing out the peculiar shaped pieces needed in a harvesting machine, amounts to nearly 500,000 feet of lumber per annum, which provide about all the fuel necessary to make steam for the works. Everything in this establishment is done by machinery, whether of wood or iron. In the blacksmith shops, the bar iron, of large and small sizes, from five and a half to four and a halfinches round, is cut up by machinery like so many pipestems. Even the forges are supplied with a steady blast of air from a large fan driven by steam. The machine shops contain one hundred lathes, drills, boring, keyseat-cutting, screw-cutting, and planing machines, worked by an almost endless arrangement of belts and pulleys. In the sickle shop of this establishment is an ingenious machine for cutting the teeth in the sickle edge, which does the work of two or three men, and much more accurately.

The machine shops of the Illinois Central Railway are also in Chicago. They employ 800 men in their establishment, whose monthly pay amounts to $60,000. Their entire works, including their car shops in the south end of the city, cover about sixteen acres of ground. The cost of construction of the machine-shops alone amounts to $150,000. The road has 4,000 cars, and 168 locomotives. They have on the stocks, and nearly finished, four of the largest engines ever built in the West, each one weighing about thirty-one tuns. The amount of raw material these works have on hand is valued at $300,000. They use up 2,200 tuns of coal per annum, principally Lehigh and Illinois.

Some Facts About North Carolina.

The *Plaindealer*, published at Wilson, North Carolina, quotes at large from our article entitled "Let Us Have Peace," published on page 329 of the present volume, and while cordially approving the views therein set forth, and testifying in the most flattering manner to the estimation in which the SCIENTIFIC AMERICAN is held throughout the South, asks us to aid in the dissemination of some facts in regard to the above State.

It states that in its immediate vicinity and throughout the State, as clear a criminal record can be shown since the close of the war as in any area of equal population to be found in any State north of Mason and Dixon's line. At least it is so as far as the white population is concerned. The laws are faithfully administered and sacredly obeyed. Property is as safe as in any civilized community to be found anywhere. It says:

"We invite Northern gentlemen to come among us, putting aside all feelings of animosity, 'burying the past,' and we pledge them a cordial welcome, and a safe field for the investment of their capital, which will bring them handsome returns."

It is with the greatest pleasure that we accede to the request of the *Plaindealer*, to assist in the dissemination of such welcome information to us and to our readers, and we think we can safely assure the people of North Carolina that when these facts become generally known an influx of capital can be relied upon. Let the Southern people remember, however, that capital is proverbially timid, and possess their souls in patience until the happy time, sure to come, when mutual confidence shall be fully restored.

Analysis of Lava.

M. Silvestri's analysis of the lava recently thrown out from Vesuvius shows that it closely resembles common wine-bottle glass. A considerable variety appears to prevail, however, in the constitution of lava, not merely when we compare specimens which have come from different vents, but when the comparison is instituted between masses of lava poured forth from the same vent at different epochs. The lavas which flowed from Vesuvius before the mountain had fallen into the state of quiescence described by Strabo contain disseminated crystals of leucite, a mineral which is very rarely found in the modern lava from this vent. And in general the latter are less crystalline than the old forms of lava. Indeed, the old lavas which flowed from Vesuvius (or Somna, as the ancient volcano was named) indicate a decided tendency to a columnar structure, corresponding to what is seen in the Giant's Causeway, the Isle of Staffa, and elsewhere.

It is a remarkable fact that the lavas of Vesuvius contain a greater variety of minerals than, perhaps, any others in the world. Hauy mentions that out of three hundred and eighty simple minerals known to him, no less than eighty-two have been found on Vesuvius; and of these several are peculiar to the locality. Sir Charles Lyell expresses the opinion that these have not been thrown up in fragments from some older formation, through which the gaseous explosions have burst, but have been sublimed in the crevices of lava, "just as several new earthy and metallic compounds are known to have been procured by *fumeroles* since the eruption of 1822."

SOME enterprising lumbermen at Niles, Michigan, are building a steamboat, which is also a saw mill. It is to be 120 feet in length, and when the boiler is placed in will draw but a few inches of water. The boat is to be used on the Missouri river for the manufacture and transportation of lumber.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

WHAT IS A FACTORY?—The law courts in England have decided that a factory is a place of manufacture or industry where not less than fifty work people are employed. Such places are subject to Government supervision under the "Factory Acts." All other places of manufacture are under the regulation of the "Workshop Acts." The working of this distinction and the carrying out of the provisions of the respective acts appear to cause dissatisfaction and to nullify the ends contemplated. There are, it is stated, over a thousand small smithies in East Worcestshire where the children are over-worked and ill-treated. Parents remove their children from "inspected" factories, and place them in workshops where no regard is paid to the law.

ENGLISH COAL SUPPLY.—The great northern coal field extends from the Tees on the South to the Coquet on the north, a distance of nearly 50 miles. Its total area may be calculated at 750 square miles, containing in round numbers coal workable to the extent of 8,000,000,000 tuns, out of a national stock estimated at fully 83,544,000,000 tuns.

A saw mill on the Shediac river, in New Brunswick, recently set itself on fire. A fresnel lifted the gate, and the mill starting, the rapid and continuous revolution of the saw, the belting of which had been left on, heated the boxes to such an extent as to set the wood-work on fire.

A mechanical exhibition is to be held in Leipsic, Saxony, in May next. It is to include all kinds of motors and machines which are used in mills, such as steam engines, turbine water wheels of complete construction, or drawings, and, in fact all appliances used in mills. Some very trifling charges are made for space. All applications are to be addressed to Mr. C. Eisenrisch, at Leipsic, before the 31st of December next.

The Directors of the Rutland and Burlington Railroad have forbidden station agents to receive as baggage any trunk, valise, or box, known to contain commercial wares. The reason assigned for this action is that commercial travelers often carry thus articles of great value, and having got them checked as baggage, hold the company responsible for loss or damage.

The Governor of Tennessee, in his annual message, recommends that no further appropriations be made to railroads in that State, except in cases where the State has a large interest in such roads, and would suffer heavy loss by the lack of such appropriations.

The *Railway Times* urges as the only remedy against the building of competing roads along some of the main lines of trade, the laying of a third track to accommodate the increasing traffic.

A new city ice boat was lately launched at Philadelphia. She is built of iron and cost $160,000. It is expected that by aid the aid of this vessel the river will be kept open during the winter months so that vessels may be able to pass up to the city.

The *Monteur des Interets Materiels* estimates the total production of copper in the world at large for 1866 at 93,415 tuns. The United States gave about 14,490 tuns.

The Worcester Gas Company's new gasometer is completed. Seven hundred thousand bricks were used in its construction. The capacity is 110,000 cubic feet. The cost amounts to $50,000.

Discoveries of silver deposits continue to be made in the White Pine Region of Nevada. It is said that the capitalists of San Francisco have largely invested in the mines.

IRON PRODUCTION OF FRANCE.—For the first six months of the present year, according to an official statement of the French Committee of Forgemasters, the total productions of the iron works of France amounted to 1,080,532 tuns.

CHESAPEAKE AND LAKE ERIE RAILROAD.—It is said that arrangements are being made to effect a preliminary survey of the Chesapeake and Lake Erie Railway.

Fifty years ago not a pound of fine wool was grown in the United States, in Great Britain, or in any other country except Spain.

The first twenty miles of the St. Paul and Lake Superior Railroad are completed. The company has called upon the city of St. Paul for $150,000 in bonds.

A new telegraphic cable has been laid across the Mississippi river at New Orleans.

The estimate for repairs and improvements at West Point Academy this year is $65,000.

Five hundred hands are working on the branch line of the Baltimore and Potomac Railroad extending from Washington toward Collingwood.

Railroads in Tennessee now in the hands of receivers owe the State over one million of dollars.

The new rolling mill and wire works at Worcester, Mass., will occupy six acres of ground.

The new stone dam across the Farmington river, at Collinsville, Conn., built by the Collins Company, is built of granite blocks cemented, with the top courses dove-tailed together.

The Salt Works at Syracuse, N. Y., are said to have produced eighty million bushels of salt.

The lumber trade at Burlington, Vt., employs annually a capital of three million dollars.

A deed transferring 339,245 acres of land from the United States to the Atchison, Topeka, and Santa Fé Railroad has just been recorded to Topeka, Kansas. It covers thirty pages of the record.

The Mechanic's Institute, at their recent exhibition in Baltimore, awarded a silver medal to the Davol Mills, Fall River, Mass., for the excellence of their goods.

The new bridge at White River Junction, Vt., is said to be a very handsome structure. It is 408 feet in length.

The Gosford (Ca.) Railway Company are surveying their proposed route for a wooden railway.

Six different railroads are building in Oregon.

NEW PUBLICATIONS.

ALPHABET OF GEOLOGY, or First Lessons in Geology and Mineralogy. With Suggestions on the Relation of Rocks to Soil. By S. R. Hall, LL.D., with Illustrations. Boston: Gould & Lincoln, 59 Washington st. New York: Sheldon & Co. Cincinnati: Geo. S. Blanchard & Co.

No one will be in danger by the perusal of the above title of ranking this little book higher than it deserves. The reverse would be more likely to be the case. It is the work of a practical teacher, and every page bears the impress of the peculiar, almost indescribable, characteristics of good teaching. As a text book for beginners in the important science of geology, we can hardly see how it could be improved.

THE CRITTENDEN COMMERCIAL ARITHMETIC AND BUSINESS MANUAL. Designed for the Use of Business Men, Academies, and Commercial Colleges. By John Grovesbeck. Sixth Edition, Revised and Enlarged. Philadelphia: E. & C. J. Biddle, 508 Minor street.

A plain, practical, common-sense text book, printed in fine style and well bound. The business forms it contains are alone worth its price.

THE ILLUSTRATED ANNUAL OF RURAL AFFAIRS AND CULTIVATOR ALMANAC, for the Year 1869,

Containing practical suggestions for the farmer and horticulturist, with about 130 engravings. By J. J. Thomas, associate editor of the *Cultivator and Country Gentleman*. Albany: Luther Tucker & Son, 395 Broadway.

THE MONTANINI: A Comedy,

Being a continuation of the fourth volume of the Dramatic Series by Laughton Osborn. New York: James Miller, 647 Broadway.

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Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

CULTIVATOR.—A. B. Spies, Sterling, Ill.—This invention relates to a new and improved cultivator for plowing or cultivating those crops which are grown in hills or drills, and which are constructed in such a manner as to admit of a lateral movement of the plow beams, so that the plows may conform to the sinuosities of the rows of plants, and also be readily raised out of the ground when required and held in a raised position while the machine is being drawn from place to place.

CHIMNEY.—August Wilhelms, St. Petersburg, Russia.—This invention relates to a new and useful improvement in chimneys, for the purpose of causing smoke to be consumed in furnaces or fire chambers.

SCALING TOOL.—Geo. V. Sloat, Morrisania, N. Y.—This invention relates to tools which are designed for use in the operation of clearing the fire flues of steam boilers of the scale or hardened sediment which is deposited on the outer surface of such flues.

ROCK DRILLING MACHINE.—Robert Gidly, Freedom Plains, N. Y.—This invention relates to a new machine for drilling rocks and other substances, and consists more particularly of a frame which can be adjusted in every direction, so as to bring the drill into any desired position, and of a new apparatus for operating the drill, which apparatus works so as to impart to the drill, in conjunction with a reciprocating, also an intermittant rotary motion. The whole machine is so arranged that it is simple and effective, and substantial throughout.

CULTIVATOR.—S. G. Peabody, Champaign, Ill.—This invention has for its object to furnish an improved cultivator, which shall be so constructed and arranged that the direction of the wheels may be easily changed by the operator, so that the direction of the plows may be instantly changed by the advance of the wheels in the new direction, thus enabling the machine to be easily and accurately guided in plowing crooked rows or in avoiding irregular hills.

RAILROAD CAR BRAKE.—John Hirst, Jamaica, N. Y.—This invention relates to a new manner of arranging the brakes of a railroad car or engine, and consists, first, in the use of an up-and-down adjustable block, which can be forced down upon the rails, it being suspended from an oscillating horizontal shaft that is turned by the brakeman. By forcing this block upon the rails, the car will be most effectually stopped. The shaft is provided with a spring or weight by means of which the rail brake is raised as soon as the chains operating it are slackened.

GANG PLOW.—Andrew Smith, Portland, Oregon.—The object of this invention is to improve the construction and operation of the gang plow heretofore invented by the same inventor. The improvements which form the subject of the present invention consist of a new method of attaching the plow to the beam, a new method of attaching and supporting the forward end of the plow beams, a new supporting frame, and a new ratchet apparatus for elevating the plows.

DOUBLE BARREL SHOT GUN.—C. E. Sneider, Baltimore, Md.—The object of this invention is to improve the apparatus for locking the breech so that it will operate with less friction, and so that the barrels will not start forward at the moment of firing; and secondly, to provide an improved device for actuating the cartridge retractor.

SNOW PLOW.—Hiram Harris, Circleville, Ohio.—This invention has for its object to furnish an improved snow plow to be attached to the pilot or cow catcher of a locomotive, and which shall be so constructed and arranged as to raise the snow from the track and throw it to the sides of said track, out of the way.

APPARATUS FOR OPENING AND CLOSING HATCHES.—James D. Sinclair Brooklyn, N. Y.—The object of this invention is to produce an apparatus by means of which any one or all of the hatches in a magazine, storehouse, or other building can be conveniently opened or closed by a person standing on one of the floors, so that it will not be necessary for such person to go for that purpose to each and every floor.

DRILLING MACHINES.—George Phillips, Cadet, Mo.—This invention relates to the drilling of rock for wells, deep blasts, and like purposes, and consists of a cylinder and piston for employing steam or compressed air in actuating the drill, in combination with the improved devices constructing the mechanism controlling and regulating the operation of the drill.

STAIR ROD FASTENING.—Thomas Sargeant, Williamsburgh, N. Y.—This invention relates to a new and improved method of fastening the rods which secure the carpet to stairs, and it consists in holding the rod in hollow sockets, by a movable knob and bayonet fastening.

DESULPHERIZING FURNACE.—Alanson Cary, New York city.—This invention consists in constructing a furnace in such a manner that the coal or other fuel which is used in the furnace for generating the necessary heat is entirely freed from sulphurous and other gases, and reduced to an incandescent state before the heat therefrom is allowed to come in direct contact with the article or substance to be desulphurized.

WAGON JACK.—John Q. Crosby, Northboro, Mass.—This invention relates to improvements in jacks, such as are used for raising the wheels of wagons off the ground, the object of which is to simplify the same. It consists of an improved arrangement of the operating lever and slide.

LAMP WICK TUBE.—Frank H. Fuller, and O. S. Severance, South Boston, Mass.—The nature of this invention relates to improvements in lamp wick tubes, the object of which is to purify the oil and prevent explosions. It consists in a wick tube, provided with isinglass lining.

STREET LAMP.—O. Case, and B. D. Evans, Columbus, Ohio.—This invention consists in the arrangement of the reservoir in the frame of the lamp, in combination with a cold air chamber, and cold air pipes for conveying cold air thereto.

SKIRT MEASURING DEVICE.—L. G. Rice, Montague, Mass.—This invention consists of an expanding and contracting skeleton frame in the form of a skirt, which may be placed on the floor beside a lady, and adjusted to a position corresponding with the hight of her waist, on which a skirt may be fitted to suit the size of the person measured.

VIBRATING NEEDLE ATTACHMENT FOR SEWING MACHINES.—Jonathan Sprague, Ann Arbor, and Alvah T. Hill, Pontiac, Mich.—The object of this invention is to provide an attachment for sewing machines for vibrating the needle for button hole stretching, filling, or any similar work requiring a side stich.

MACHINE FOR WASHING AND COMBING BRISTLES, HAIR, ETC.—Louis F. Lannay, Indianapolis, Ind., and William F. Parks, Baltimore, Md.—This invention relates to improvements in machines for washing hair, bristles, etc., such as was patented to Louis F. Lannay, May 19, 1868, and consists in the combination therewith of a combing apparatus whereby the two operations of washing and combing may be accomplished at once, which have heretofore and until now been done separately and necessarily at greater expense than when done simultaneously and for the same machine.

SASH FASTENING DEVICE.—Wm. M. Warren & Chas. A. Warren, Watertown, Ct.—This invention relates to that class of sash-fastening devices where racks, pinions, and balancing springs are used, a part of which is applicable whether springs are used or not.—This consists of an improved arrangement of the locking-pin, whereby the same is more readily actuated for unlocking the sash. Also, of an improved, detachable device, for winding up the springs when springs are used for balancing the sash.

WAGON HUBS.—Alonzo S. Woodward, Pepperell, Mass,—The object of this invention is to furnish a light, strong, and easily fitted hub for wagon wheels, the same being made of cast metal, in three parts, and held by the longitudinal bolts. Other devices appertain to the invention tending to perfect the same.

INSTRUMENT FOR SHARPENING CALKS.—Henry Kime, Marshalltown, Iowa. The object of this invention is to sharpen the calks of horse shoes, while the latter is on the animal's foot. It consists of a nib plate, pivoted within the recess of one of the handle of the instrument, and arranged in such corelation with the other handle that the head of the latter will actuate the lever extension of the nib-plate, and cause its nib end to close upon the calk of the horseshoe, nipped between the said nib and the proximate edge of the recess, whereby the calk is cut off with a tapering cut, which leaves it with a sharpened or renewed edge.

SLED BRAKE.—James M. Ackerson, La Fayette, N. J.—This invention has for its object to furnish an improved brake for attachment to sleds, sleighs, etc., which shall be simple in construction, readily attached, and conveniently operated, and which shall be so constructed and arranged, that it may be used with equal facility for braking the sled when ascending and when descending a hill.

REVOLVING HORSE RAKE.—A. B. Johnson, Washington, Ind.—This invention relates to a new and useful improvement in the construction of a double revolving horse hay rake, which improvements consist in adjustable axles for the driving wheels suspended to the side beams of the frame by stirrups and an arrangement of devices for holding the rake while at work and turning it over to discharge the hay.

HAY FORK.—Roland S. Frame, Washington, Ohio.—The object of this invention is to furnish a simple, effective, and easily operated hay fork, of the class usually known as "horse power hay forks."

CHEESE CUTTER.—J. G. Dreher, Pine Grove, Pa.—This invention relates to improvements in cheese-cutting apparatus, whereby it is designed to provide a means for cutting it with accuracy, ease, and without waste, by the employment of a circular table for rotating the cheese and a vertically-oscillating knife.

WAGON JACK.—James Moody, Harwich, Mass.—This invention has for its object to furnish an improved wagon or lifting jack, simple in construction, effective in operation, and not liable to get out of order.

HARROW.—C. Hanson, Owatonna, Minn.—This invention has for its object to furnish an improved harrow, simple and strong in construction, and effective in operation, doing its work more thoroughly than harrows constructed in the ordinary manner.

LIFE LINES FOR SEA BATHING.—William Tell Street, Frankford, Pa.—This invention has for its object to furnish an improved device for the protection of life at sea bathing places, and also for the support and amusement of the bathers.

WATER METER.—Isaac Carey, Warwick, N. Y.—This invention relates to a new and improved water meter and is designed to measure and register the amount of water used by the occupants of a building. The invention consists of a tilting measure arranged in connection with valves and water supply and discharge tubes.

MEMORANDUM BOOKS.—Luciene G. Matthews, New Albany, Ind.—This invention relates to an improvement in memorandum books and blank books generally, and consists in so forming the cover of the book, and so binding the blank paper or pages of the book, that the two may be readily separated, thereby rendering one cover sufficient for an indefinite number of books.

WINDOW BLINDS.—James Boyd, Mamaroneck, N. Y.—This invention relates to a new device for locking slats of Venetian window blinds in any desired position, so as to obtain a certain desired quantity of light in a room. The invention consists in the use of a crank arbor, connected with the slat rod, and provided with a lever that is by a spring pressed against the edge of a notched or corrugated plate. By fitting the lever into any one of the notches, the arbor will be locked, and will also lock the slats. To bring the lever into another notch, it must move in a horizontal direction, and for that purpose the arbor is made sliding in its bearings.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

A. C., of Mich.—The dials of steam gages are of brass, enameled.

W. L. J., of Ill.—We cannot undertake to furnish the information you desire in reference to aerial ships, such as would be useful to you for a popular lecture. If you want information of this character you can find it by reference to our paper during the past twenty years.

A. P. J., of Colorado.—There is no doubt that the plan of crushing gold bearing quartz with running water tends to lessen the yield of the metal. The liquid paste that leaks or runs away—as more or less will—must bear with it some portion of the gold. We believe machinery is made in this city for grinding or crushing quartz into a dry powder.

H. C., of R. I.—There is no reason except the want of a suitable lamp why the heavy hydro-carbons—petroleum unrefined, for instance, should not be used for illuminating purposes. All the elements of illumination are there; only a sufficiency of oxygen is required.

J. W. F., of Texas, asks what is the pressure required to press a 500 lb. bale of cotton. Such information can be obtained only by experiment; theoretical calculations are useless. As our correspondent lives in a cotton growing state it cannot be difficult for him to visit some press, measure the power used, and the elements of the means—pitch of screw, if a screw press, length and actions of levers, if a lever press, etc.—from which exact calculations may be made.

M. P., of Ohio, suggests boring into the earth to obtain heat the great power producer, and quotes the fact of the increase of temperature at increasing depths as suggesting the possibility of success. More improbable projects have been proposed and some have been successful.

F. M. H., of N. Y., states that he has contrived a two-wheeled velocipede which will run on snow, support itself in an upright position when not in motion or when running slowly, and promises a description shortly.

T. P. J., of Ohio.—Your idea that it is better to throw on a belt at rapid speed of the shaft than at slow speed is not a correct one. We have no doubt many of the accidents reported are occasioned by acting according to just such notions. A good rule is this: "Better be foolishly careful than foolishly careless"; or, in other words, refuse to place a heavy belt on a pulley running rapidly. Carelessness of this rule came came near whisking the writer out of this world, and gave his father a broken arm. Insist on slowing the engine or water wheel—the motive power—before you endanger limb or life to save five minutes of time. Machinery is cruel; power exerted by it is imperative; human life is more valuable than time. In dealing with machinery you are the master until you yield your position; then you are a helpless victim to a power that has no mercy or remorse.

J. S. S, of Md.—The oxidized blue surface of gun barrels and pistols cannot be restored, when worn off, without heat.

G. N., of———Crocus, otherwise crocus martis, rouge, or colcothar is the sesquicxide of iron. It is much used for polishing. You can easily make it by roasting sulphate of iron (green vitirol—copperas).

J. McC., of N. J.—A column of air will be much more effectually heated by passing it through a number of heated flues, than through one large one. There is no difficulty in retaining the heat in a long column of air, but the tubes through which it passes ought to be made of some non-radiating material, bright tin plate is as good as anything for the purpose. The column ought to have considerable rise to get up much of a circulation unless artificial means are used force it, when the amount of rise is immaterial.

A. H. S., of Mass.—"The debris of my shop (a machine shop) I sweep up and put in a common receptacle as worthless. I have been told lately that turnings and drillings are valuable. Had a better separate them from the waste?" Unless you have a foundery handy we would not advise the saving of turnings, borings, and drillings, but if so they may be made useful in quanties by compressing them and melting them in a crucible. You had better in any case, separate them from the waste, as their contact tends to a spontaneous combustion.

G. W. R., of D. C.—Any substance not capable of becoming a magnet interposed between two magnets, will lessen the force with which they mutually attract each other, so far as it separates the poles from each other, but there is none that will destroy their attractive power.

J. H. B., of Mass.—"Will you explain the difference between the fire and 'flash' tests for refined petroleum oil?" The legal test (fire) for petroleum oil is 110° Fah. This means that the liquid shall, when heated to that temperature, extinguish flame when brought in contact with it; as when a lighted match is plunged into kerosene heated to that temperature, which may be easily determined by immersing the bulb of a Fahrenheit thermometer. The "flash" or vapor test is igniting the vapor arising from the heated liquid and noting the temperature of the oil as before. At the heat test no inflammable vapor should be given off. It is the safest method of testing illuminating hydrocarbons.

P. J., of N. J.—Merely washing and varnishing old oil paintings will not restore them. Varnishing them frequently destroys their effects by producing false lights. Take your painting out of the frame, lay it on a table or bench, face up, and keep a wet cloth on it for two or three days, changing or cleaning the cloth as often as it becomes soiled. When the painting is clear wash it with a sponge or brush dipped in nut oil. This is better than varnishing.

W. B. C., of Ill.—Smalt is either ground glass or quartz sand, in the first case colored in the furnace, and in the latter by heating the sand in an open pan with a coloring matter mixed with oil and turpentine. It should be constantly stirred, and the work done in a draft of good air, the operator keeping on the windward side. The vapors are not healthy.

A. B. M., of Ind.—We are aware that a number of processes have been made public for increasing the durability of fence posts, etc.; but while all of these have more or less objections to their general adoption one method is cheap and can be used anywhere. That is to char the posts in a fire, or rather that portion that is to go into the ground. Ordinary tar or the coal tar from gas houses will do the business—convert the outer portion of the wood into charcoal—as well as the charring by fire, only more slowly.

W. W. B., of R. I.—Tallow is a better lubricator for the axles of wagon wheels than any patent article ever invented. If you wish to imitate these things add lard and plumbago (black lead). By the way, black lead and tallow is a good mixture where friction is great.

P. J. V., of Pa.—Brass turnings and filings may be melted without much waste if compressed in a crucible until the vessel is full, and then the top of it covered and luted with pipe clay.

M. A. K., of Ohio.—Castor oil is a good substitute for neat's foot oil for softening leather, belts, boots or harnesses. Neat's foot oil is however, our choice.

Business and Personal.

The charge for insertion under this head is one dollar a line. If the Notices exceed four lines, an extra charge will be made.

Send a stamp to Milton Bradley & Co., Springfield, Mass., for priced catalogue of their games and home amusements.

Send 10 cents to T. E. Zell, the publisher, Philadelphia, Pa., for a specimen No. of Zell's new popular Encyclopedia.

Very cheap—a desirable new patent offered for whole United States. Circulars and photographs sent. Box 207, Ripon, Wis.

If you wish to buy a patent, or sell one, or become a canvassing agent, address Bent, Goodnow & Co., Boston, Mass.

For 50 cents I will send to any address, postpaid, one of my patent paper cutters and rulers. Address S. W. Wilcox, South Milford, Mass

Wanted—a permanent situation by an experienced pattern and model maker and draftsman. Good references given. Address S., box 16, Kingsville, Ohio.

Look out for orders, manufacturers and machinists. See manufacturing news of the United States in Boston Bulletin, which will post you where to solicit them. The Commercial Bulletin, Boston, $4 a year. Advertisements 17c a line.

Millstone-dressing machine, simple and durable. Also, Glaziers's diamonds, and a large assortment of "Carbon" of all sizes and shapes, for all mechanical purposes, always on hand. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

Peck's patent drop press. For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Conn.

Wanted—A good man, thoroughly posted in the working of spoke and wheel-making machinery, as foreman in a wheel factory at Marietta, Ohio. A good salary will be paid to one who can come well recommended. Address F. W. Minshall, Sec., Postoffice box 204, Marietta, Ohio.

For sale at a bargain—A good second-hand steam engine, 30 horse-power. Apply at once to P. & F. Corbin, New Britain, Conn.

Permanent employment for a No. 1 blacksmith. Address, with terms, Isaac, Evening Shade, Ark.

See A. S. & J. Gear & Co.'s advertisement elsewhere. Keep posted.

If you want to buy a good factory or machine shop, with water power, read advertisement on back page, of one for sale.

For descriptive circular of the best grate bar in use, address Hutchinson & Laurence, No. 8 Dey st., New York.

For Hackle Pins, etc., address J. W. Bartlett, 569 B'dway, N.Y.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for Lithograph, etc.

Portable pumping machinery to rent, of any capacity desired, and pass sand and gravel without injury. Wm. D. Andrews & Brother, 414 Water st., New York.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

The Lillingston paint, described Nov. 18, in Scientific American, can be had at 528 Water st., New York. Address Lillingston Paint Co

The paper that meets the eye of all the leading manufacturers throughout the United States—The Boston Bulletin.

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The Great Abattoirs at Communipaw, New Jersey.

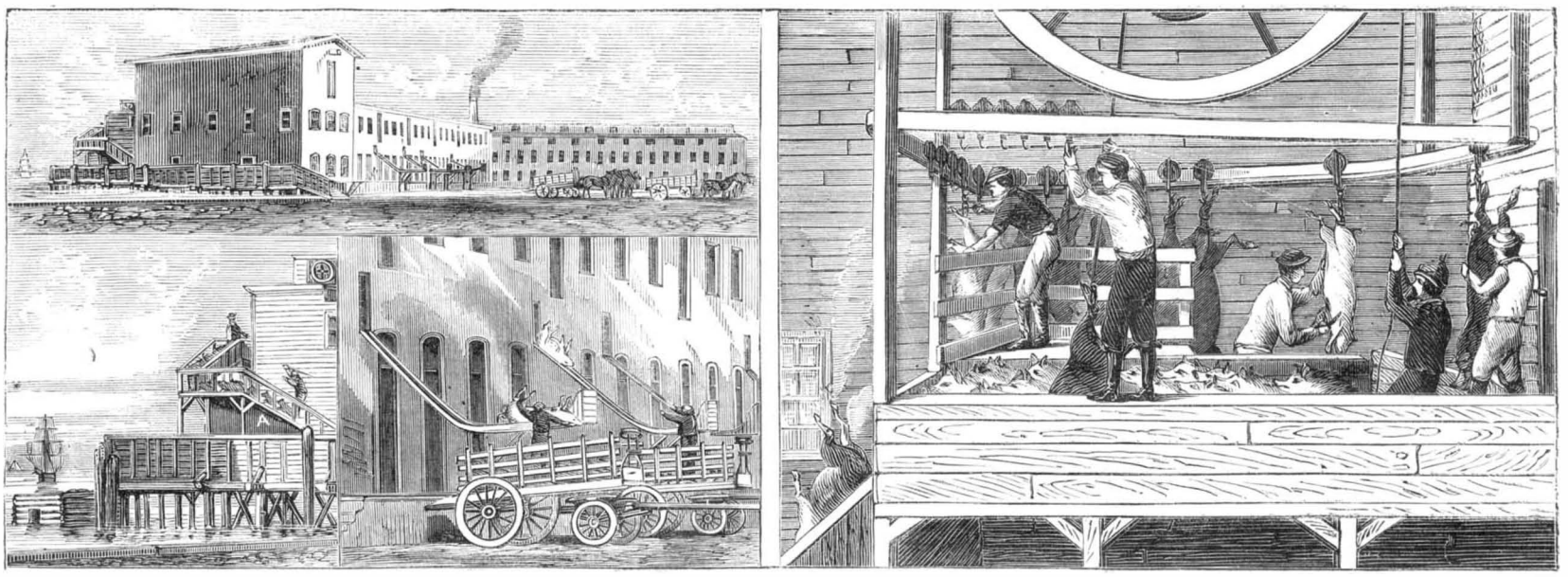
We give in this number a series of engravings representing the buildings of the "New Jersey Stock Yard and Market Company," with the process of dispatching hogs and preparing their carcasses for the market. It will be of interest to many of our readers in the vicinity of the metropolis, and to those engaged in raising beeves, sheep, and hogs, for the market, especially in the South and West.

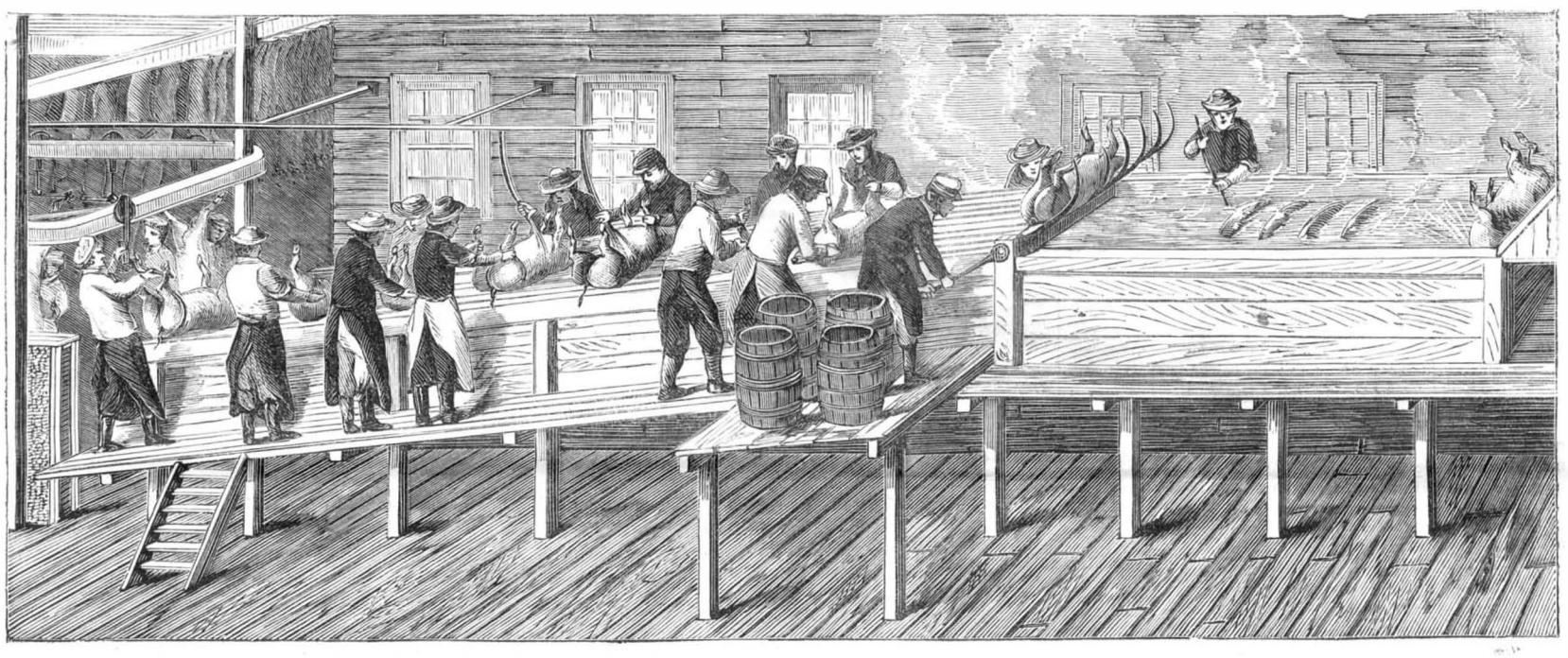
The buildings and stock yards cover fifteen acres of ground, and the capacity of this establishment for slaughtering and preparing is, of beeves, 7,000; hogs, upward of 35,000, and of sheep over 25,000 per week. The slaughtering and dressing of a bullock requires from ten to twelve minutes, and for hogs and sheep still less. The abattoir proper, or slaughter house —engraving on the left—is 620 feet long by 60 feet wide, with an L 100 feet long by 40 feet wide. Another building, not shown in the engraving, 40 by 40 feet, is for slaughtering sheep. All these buildings are of two stories. A steam engine of twelve H. P. drives shafting for hoisting, etc., and the buildings are plentifully supplied with pure cold and hot water, of both of which vast quantities are used.

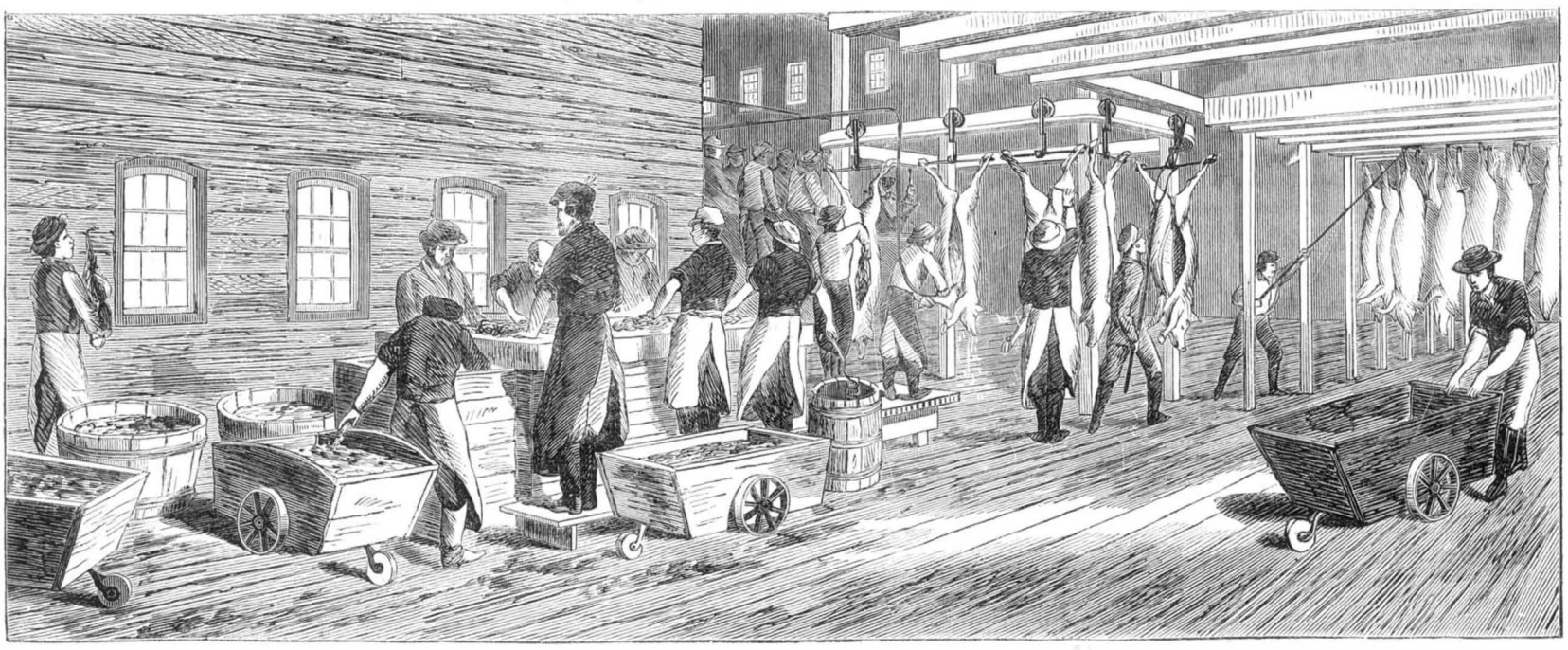
The hog department is on the second floor As the swine arrive by the cars they are driven into large pens in a building 800 by 100 feet. Here the animals are fed and furnished with water *ad libitum*. Alleys are arranged with gates through which, when opened, the hogs are led or driven, as seen in the engraving, to the second story of the slaughter house. The engraving on the right shows the first process in the killing and bleeding department. An animal being selected, and a small chain being attached to its hind legs, it is hoisted to the iron rod, squealing and struggling with characteristic vigor and obstinacy. The "sticker" then inflicts the fatal stab in the throat, and the hog is slid along the rail toward the scald ing trough, to make room for others; and ere this one is dead it has been joined by about a dozen of its companions. In this department three men and a boy are required. The scalding tank is 12 feet long by 5½ feet wide and is attended by two men.

Soon as the hog is scalded sufficiently, he is floated to a sort of rotating grating, by which he is lifted out and rolled upon the scraping table at which are fourteen men, seven on each side. The first two take off the bristles and long, stiff hairs, which are saved in barrels. The animal is then passed to the next eight, four on each side, who are designated "scrapers"; they take off the bulk of the hair, and pass the hog along to the last four, who are called "cleaners"; these clean the head and feet, and more difficult parts. At the end of the table stands a man known as the "gambrel cutter"; he puts in the gambrel and again the hog is suspended on a circular railway. The carcass, unopened as yet, is passed at once to the "gutters" who stand at the end of the fat-cleaning table. Their duty is to take out the intestines, liver, heart, and lungs, which is all done at once, and deposited by them on the fat-cleaning table, where six men are employed for that purpose. The fat, liver, heart, and intestines are steamed in tanks. The hog is next passed to the washer, where it is thoroughly washed and scraped down with a large knife. The carcass is now ready for the drying room.

At the head of the drying room there is a one track railway, along which is run, on a wheel and hook like the rest, a two pronged lever or fork. This fork is so placed as to lift the hog by the gambrel and transport him from the dressing rack to any one of the "slides" in the drying room. He is then placed in the slide, pushed back close to his fellow, and left to drain and cool. The fat, as fast as it is cleaned, is carted by means of box trucks to the rendering tanks, ten in number, each of which has a capacity sufficient for the fat from one thousand hogs. The steam is condensed and the offal and blood used in manufacturing fertilizers.







SLAUGHTERING AND DRESSING HOGS---THE COMMUNIPAW ABATTOIRS.

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VOL. XIX., No. 25...[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, WEDNESDAY, DECEMBER 16, 1868.

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THE "SCIENTIFIC AMERICAN"---RETROSPECTIVE AND PROSPECTIVE.

The present volume of the SCIENTIFIC AMERICAN will close with the next number, and it is quite appropriate at this point that we should not only review our work, but also look forward to what we intend to do in the coming volume.

We may be permitted a little self-gratulation upon the growing success of our enterprise, as evinced by our widely-extended subscription list, and the many tokens of warm approval which we daily receive. Our aim has been to present the truths of science in a plain, practical, and intelligible manner, unburdened, so far as is possible, with technicalities; to keep pace with the rapid march of improvement in all departments; and to combine the whole material of each weekly repast, presented to our readers, in such a way, that the tastes and wants of all would be as far as possible remembered. To this end we have called to our aid the best talent that could be procured, regardless of expense. We have embellished our paper with engravings by the best artists, in their peculiar province, to be found in this country; and we look back with satisfaction and a modest pride at the results of our combined labors. Scarcely a topic of modern interest in the sciences or in the arts has not been touched upon in this volume. It contains the materials for a history of the arts during the period of its publication. That the original matter, of which our paper can boast as large a share as any publication of its size upon this continent, has been of a high order, is evidenced by its having been largely copied at home and abroad; in the majority of cases full credit having been given.

The growing popular taste for natural and mechanical science we regard as one of the most encouraging features of the age. We read in it not only the assurance of vast and immediate progress, the discovery of new facts, and substitution of correct for false deductions from those already known, but the assurance of the peculiar adaptation of our paper to the tastes of the age, which guarantees to us as much success in the future as we have had in the past.

The extensive patronage which the SCIENTIFIC AMERICAN enjoys has enabled us to fix and maintain a lower rate of subscription than any other paper of its size and character published in the world; and notwithstanding our design is to always advance, and although to advance implies additional expenditure, we expect to be able to continue our present rates. And we feel justified in entertaining and giving expression to the opinion, that our paper is worth very much more than its cost to any man, be his trade or profession what it may.

We pledge ourselves to spare neither expense nor endeavor to make the SCIENTIFIC AMERICAN the best paper of its class published anywhere; a medium for the free expression of valuable ideas; an honest and impartial critic upon the mistakes and follies of the age; an instrument for the exposure of all humbug and pretension, in the departments to which our paper is devoted; and a storehouse of useful and entertaining knowledge for the people at large.

With the new year we expect to give an increased value to the SCIENTIFIC AMERICAN, both in quantity and quality of the illustrations and general reading; and, with the hearty co-operation of our many friends, we expect to greatly increase our circulation.

POOR MECHANICAL WORK ON AGRICULTURAL MACHINERY.

No person possessing mechanical taste, at least, no person having a mechanical eye, can have failed to notice the difference between the fit of the parts that make up an agricultural machine and those of almost any other piece of machinery. The steam engine, whether marine, stationary, locomotive, or fire, the machines used in the manufacture of cotton or woolen, or iron, or anything, are pleasing to the eye and gratifying to the taste, whether at rest or in motion. But we seldom see anything in the "make-up" of a mower or reaper that awakens enthusiasm, or calls forth the approbation of the mechanic. To see the grass or grain go down before the inevitable fate and force of the mower or reaper, like the generations of men before the "death dealing scythe of time," may give an idea of power, but neither in rest or action does the agricultural machine—mower, reaper, or thresher—gratify the eye of the mechanic.

It is unpleasant to the mechanic (and it must be unpleasant to the farmer) to see roughly turned shafts, which must revolve very rapidly, seated in boxes that never were turned, or bored, but only smoothed on swiftly revolving spindles covered with emery; the boxes cast iron, and the shafts of the cheapest material. Cast iron, cast iron, and only cast iron, and even that rough and unfinished, seems to be the rule. Where nice forgings are required are castings, malleable it may be, but neither worked nor finished. Work that no mechanic would allow in his shop as a part of his business "plant." Coarse, rough file marks, asphaltum varnish, high colors of paint, and brilliant varnish do not hide from the mechanical eye the shortcomings of the workman on these machines.

They ought not be called machines so far as workmanship is concerned. It is a shame that the manufacturers of our agricultural machinery should have so low an estimate of the judgment of the farmers of the country as to palm off on them contrivances which cannot stand the test of wear and tear. Many of the purchasers and users of agricultural machinery are good mechanics, good enough to understand the difference between good and poor work. There is no reason why machines for use on the farm should not have as large a proportion of honest workmanship, of good material, and proper proportion of parts as machinery intended for use in the shop, the factory, or the ship.

CARBONIC ACID IN WATER.

A correspondent calls our attention to the following, from the Philadelphia *Ledger*, as a specimen of the erroneous character of many things which "go the rounds" of the press:

"TO PURIFY A ROOM.—Set a pitcher of water in a room, and in a few hours it will have absorbed all the respired gases in the room, the air of which will become purer, but the water utterly filthy. The colder the water is, the greater the capacity to contain these gases. At ordinary temperature, a pail of water will absorb a pint of carbonic acid gas and several pints of ammonia. The capacity is nearly doubled by reducing the water to the temperature of ice. Hence, water kept in a room a while is always unfit for use. For the same reason, the water from a pump should always be pumped out in the morning before any of it is used. Impure water is more injurious than impure air."

Our correspondent points out the error that water containing carbonic acid will become noxious by its absorption, and that that is a reason why water which has stood in a pump should be rejected. But there is another error still in the statement. A pitcher of water placed in a room will not absorb all the carbonic acid caused by respiration of a single individual for one hour. A healthy adult exhales about 16 cubic inches of carbonic acid per minute from the lungs. Add to this the quantity eliminated from the skin, and we shall have for eight hours nearly six cubic feet. Water, at ordinary temperature absorbs its own bulk of carbonic acid. Under pressure, it may be made to take up five or six times as much, as in soda-water fountains, but, allowing even the greatest absorption, it would be a large pitcher that would contain water enough to absorb the carbonic acid exhaled by a single pair of lungs for one hour. But our correspondent must not expect scientific accuracy in the benighted daily press. We have long ceased to expect it.

Water should be rejected that has stood long in a pump, because it is generally contaminated by the pump itself. If it is good, sparkling, drinkable water before it is drawn into the pump, it has more carbonic acid in it than it will be likely to have after it has become warm by standing in the pump. That fact alone would make it flat and unpalatable, and would be sufficient cause for its rejection. We doubt not the very sage person who wrote the paragraph in question has often tickled his palate with ten cents worth of water charged as highly as possible with carbonic acid from a so-called soda-fountain, and we have no doubt that if he had a mixture of lemon and vanilla syrup in it, he found it pretty good to take on a hot July afternoon, and not in the least detrimental to his bodily health. At least that is our experience.

AN ancient pear tree planted at Newton Corner, Mass., in 1650, is still vigorous and bears good crops. It is supposed to be the oldest pear tree in New England.

DESTRUCTION OF FORT LAFAYETTE BY FIRE.

On the first of December the historic fort known formerly as Fort Diamond and latterly as Fort Lafayette, situated at the Narrows, entrance of New York harbor, was accidentally set on fire, destroying the whole internal portion and leaving only the external walls and the magazine intact. The danger of injury to dwellers on the contiguous shore was deemed so great that the houses in the vicinity of Fort Hamilton, which commands Lafayette, were vacated by their occupants, and a guard was detailed from Fort Hamilton for the protection of property thus abandoned. Fortunately the protection of the magazine was sufficient, and although the fire raged nearly twenty-four hours, and a number of shells were exploded by the heat, no lives were lost.

As a means of defence the fort was worthless and will not probably be rebuilt as a fortification. It will be remembered chiefly as a place of detention for state prisoners during the war of the rebellion.

A NEW MECHANICAL TOY.

Some of the most ingenious and interesting mechanical toys that have been invented, are the walking boys and girls, just being introduced in Broadway.

The figures are constructed so that they literally walk, taking up the feet by bending of the knees in the most life-like manner. The mechanism is very simple but ingenious. They are propelled by the spring and clock movement usual in operating mechanical figures, but improved and adjusted skillfully to this toy.

It is the invention of W. F. Goodwin, of this city. Mr. Goodwin has obtained patents at home and in most foreign countries through the SCIENTIFIC AMERICAN PATENT AGENCY.

The heads of the figures are manufactured by G. H. Hawkins, 383 Canal street, under a patent also secured through this office.

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PATENT OFFICE ITEMS.

Messrs. James Griffin and Peters, the board recently appointed at the Patent Office to examine into the manner in which all contracts with the office are filled, have begun the discharge of their duties, and heard some testimony. It will be several days before they will be prepared to make a report.

The Commissioner has refused to extend the patents of Theodore Weed and T. J. W. Robertson, both for sewing machines. He has also recently heard arguments in the case of Cyrenus Wheeler, for harvester, a machine that has been extensively used by farmers.

No decision has yet been announced.

CANADA, NOVA SCOTIA, AND NEW BRUNSWICK.

We have a large list of subscribers in the Dominion, many of which expire on the first of January. We hope they will not only all renew, but send in other names. The only difference in the terms of subscription is the addition of 25 cents to cover pre-payment of postage.

A SIGNIFICANT FACT.

During the week ending December 1st., there were filed in the Patent Office 255 applications and cavcats. During the same week 103 applications and caveats were entered upon the records of this office. Inventors fully understand where their interests are best served.

Gold Mines in New York State.

Gold bearing quartz has been discovered in Dutchess county, N. Y., consisting of a series of veins comprising a belt half a mile wide, and extending north-easterly an indefinite distance. No actual workings of these veins have been attempted, but large quantities of the rock have been removed and submitted to analysis, resulting in showing a yield of gold varying from $27 to $100 per tun. When it is considered that quartz yielding only $7 and $8 per tun is profitably wrought in California and North Carolina the value of this discovery may be appreciated, situated, as it is, within a hundred miles of New York city and near the banks of the Hudson.

PETROLEUM IN THE CAUCASUS.—The *Sun* is responsible for the following:

"One of the most remarkable deposits of petroleum is in the region of the Caucasus Mountains. The oil springs have been known and the oil collected there (by skimming) for ages. On the eastern shore of the Caspian 20,000 such wells, all of them quite shallow, are now skimmed. The wells are often quite close to each other, and a new one does not affect the productiveness of another near it. One sunk in 1863 by the very side of another, which had for centuries produced 3,400 pounds per day, yielded 40,000 pounds per day, without affecting in the least the other. The American method has lately been introduced, and flowing wells have burst forth from a depth of 250 feet, which have, until controlled, maintained a jet from forty to sixty feet high. It is calculated that 19,000,000 pounds are annually produced in the Caucasus region, while 200,000 pounds of paraffine are now made from asphaltum."

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REMINISCENCES OF TRAVEL IN SPAIN.

GOTHIC CATHEDRAL—THE ATOCHA CHURCH—THE QUEEN'S RELIGIOUS HABITS—ROYAL STABLES, COACH HOUSES AND MUSEUMS.

NO. II.

Among the many striking features which impress the tourist in Spain, and of which we spoke in our last week's article, are the great number of magnificent cathedral churches, chiefly of the Gothic order of architecture. Indeed, so prominent are these structures, that they have been made the subject of an elaborate work by George R. Street, a well-known English writer upon architecture; and yet, singular enough to an unprofessional mind, the author omits in his work, all mention of the majestic cathedral at Seville, which some writers have declared second only in magnitude to St. Peter's at Rome. With the possible exception of the Dom at Cologne, with its graceful springing arches; the cathedral at Milan, with its forest of spires and pinnacles; and the Metropolitan church at Amiens in France which has probably the finest Gothic interior in Europe, it appears to us that no other ecclesiastical edifices of this order are comparable to those in Spain; and it is a marvel how so much wealth and genius were ever combined to produce such grand cathedral churches as are found in the dull, sleepy old cities of Burgos, Leon, and Toledo; and what is still more singular is the fact that although Madrid is the capital of Spain and its most populous city, it is nevertheless the poorest in church edifices, having nothing in this respect worthy of notice.

The Spanish Cathedral, apart from its architectural character, is usually a place of deep historic interest. Within its precincts, the representatives of the nation often assembled, kings were christened, anointed, and buried. They were also museums of natural history and the fine arts, and to this day they contain not only valuable paintings of the Spanish masters but also stuffed animals of rare species, beside specimens of precious marbles, corals, elephants' tusks, and other natural curiosities either sent as presents by Eastern princes or successful navigators, whilst within the porches courts of justice sat to hear and decide causes in litigation. An example of this kind is witnessed once a week at Valencia, the water tribunal sitting in the cathedral porch to adjust the irrigating privileges of the *huerta*, which makes that spot a paradise of oriental beauty and luxurience. In addition to these, the examples of wood carving, iron, silversmiths' work, and exquisite painting on glass, show that Spain at one time possessed artisans of the highest skill and ingenuity.

The late unfortunate queen was like her royal predecessors, a devout religionist, and especially distinguished for her singular devotion to the Virgin—a circumstance not to be wondered at considering her training, and being a woman she naturally looked to one of her own sex as the source of comfort and support in the many perplexities that surrounded her throne. The queen was accustomed, it is said, to ascribe all her blessings, both spiritual and temporal, as flowing from that source; and it was her habit, on every Saturday evening at six o'clock, to visit an old church called the Atocha, situated on the outskirts of the city—a building wholly destitute of architectural grace, but which possessed a black miracle-working image of the Virgin, carved, according to tradition, by the Evangelist St. Luke. This image, of life size, stands upon the high altar of the Atocha, and is dressed in most regal robes, and possesses a wardrobe equal in richness to many of the royal women in Europe—not as some declare of cast off clothing of the queen, but splendid robes of silk, satin, and velvet, embroidered in gold, silver, and other expensive laces. There are twenty-seven of these robes, carefully preserved in presses, any one of which would have dressed the queen for a state occasion, and are cheerfully shown to strangers by a very civil ecclesiastic, who takes a good deal of pains to point out their beauties and to name their donors. Soon after the birth of the first royal baby, and when the queen was able to quit the maternal couch, she proceeded in ceremony to the Atocha, for the purpose of presenting the infant and a suitable thank-offering at this shrine, and as she descended the staircase of the palace a desperado approached her feigning to present a petition, struck the queen with a stiletto, which, but for a gold lion embroidered upon the velvet robe, would probably have ended her life. The wound, however, proved to be slight, and nothing daunted by the fiendish assault, she went to her devotion, ascribing the providential interposition to the Virgin. As an act of special gratitude, after removing the gold lion to be kept as a household treasure, she left the blood-stained robe which cost $19,000 as a thank-offering.

Independent of the rich wardrobe of which we have spoken, the Atocha church is a curious museum of votive offerings. The walls of the side chapels are literally covered with plaster or wax models of arms, eyes, breasts, hands, feet, legs, locks of hair, splints, crutches, coarse pictures, clothing, and other articles deposited there in acknowledgment of the miraculous power of the Virgin in healing disease and injury.

The churches in Spain, however, are not singular in these manifestations of pious faith. They are often witnessed in other parts of Europe. The Atocha, at the time of our visit, was so much revered for its saintly character and precious relics, that an armed guard was stationed at its doors, and a remarkable reverence was shown by all who entered within its precincts.

The royal stables and coach-houses are usually opened once a week to all who take the trouble to obtain tickets of admission. The stables contain a stud of upwards of two hundred horses, nearly all thoroughbreds, and of varied colors, beside a hundred or more splendid mules. The queen and the royal children were accustomed, in bad weather, to ride after mule teams, and it was no uncommon sight on the streets of Madrid to see fine carriages drawn by mules in handsome harness. The Spanish horses have short necks, large barrels and clumsy legs, and are not considered equal to those brought from other parts of Europe. Therefore the stud in these stables are chiefly exotics.

The coach-houses are still more interesting, as they contain an endless variety of carriages—from the baby chaise to the ponderous state coach of Charles the Fifth—including the curious old machine in which Crazy Jane carried about the dead body of her Philip the Bel, said to be the first coach brought into Spain. Crazy Jane and her husband were buried in the cathedral at Grenada in the same tomb with her parents, Ferdinand and Isabella. In the upper rooms of the coach-houses are carefully preserved the harness, saddles, housings, liveries, and other elegant trappings of the royal equipage. The Spaniards have always been famous for their skill in making fine harness and saddles, and this collection is perhaps one of the richest in Europe, not only in historical association, but also in the exquisite quality of workmanship.

A recent letter from Madrid states that the whole of the carriages and harness are to be publicly sold, a measure that will be much regretted by all who are interested in preserving historical relics. French revolutions have always been marked by destructive excesses, and many are the beautiful objects of art which have thus disappeared, but in spite of all this they have contrived to preserve the antique equipages of their kings, which are carefully kept at Versailles.

The Armory and Military Museum possess many objects of rare interest such as kingly swords, arms, crowns, helmets, and suits in armor, of exquisite workmanship. Among the numerous objects which attract most attention are the complete armors worn by Columbus, weighing 41 pounds, and those of Charles the Fifth and Philip the Second, and the curious old litter used by Charles the Fifth in campaign, when gout prevented him from riding; also the magnificent field tent of Ferdinand and Isabella.

The Spanish, at one time, were a maritime, adventurous race, and hence the naval museum of Madrid contains a valuable collection illustrative of the ancient art of ship-building. What interested us most, however, were specimens of ancient caravels, or ships, exactly like those in which Columbus made his voyage of discovery. Here is also preserved the rude chart used by him on the voyage, the sight of which set in motion a train of reflection upon the wondrous chain of events and discoveries which have succeeded. The ocean is crossed several times every ten days by steam, and intelligence courses through its depths with the rapidity of the lightning flash.

THE ENGINES OF THE "WAMPANOAG."

So much has been written about the engines of this ship, that what I have to say may seem superfluous, but still it may interest a few. Commodore Alden, in his report, finds fault with the engines on account of their want of "bed" plates, supposing that English engines, of large size, are provided with that part, and attributes the heating of the journals of the *Wampanoag* to their deficiency.

The English ship *Warrior* has been often compared with the *Wampanoag*, both as regards engines and speed. Now this ship, free as she may be from hot journals, has not the sign of a bed plate; therefore it is not possible that the good working of the *Warrior's* engines can be attributed to bed plates.

The engines of the *Warrior* are of the double-trunk variety, consequently the connecting rod acts directly from the piston to the crank pin, thereby making the engines much shorter across-ship, when the distance is measured from the center of the crank shaft to the center of the pistons at half-stroke. This being so, the framings are naturally reduced in length. At the ends of the framings, in the *Warrior*, three in number, come the condensers, firmly bolted to all of them, or at least connected by a short distance piece. The cylinders are bolted close together, within a few inches of one another, and form a combination almost as solid as a single casting. To the two cylinders the framings are bolted directly and in the strongest manner. It is evident, that, by the adoption of this plan, a stiff and rigid combination must be the result. The framings being connected together at one end by the two cylinders, and at the other by the condensers, forms, in itself, almost a solid mass. Diagonal strains cannot affect this engine in any appreciable manner, and it would be difficult for the shaft to have its journals thrown out of line, running as it does, through the bearings in the frame between the cylinders and condensers.

Let us now look at the general plan of the *Wampanoag's* engines. The two cylinders are placed on one side of the shaft, but are not bolted directly to one another, the large surface condensers being interposed, but this is not an element of weakness. In looking at the framings and comparing them with those of the *Warrior*, we notice this difference, that those of the English ship are firmly connected at both ends, while those of the *Wampanoag* are secured only at the end where the cylinders are placed, and in this difference of design the reason for the hot journals may be found. Where the front of the condensers are in the *Warrior*, we find, in the *Wampanoag* the engine shaft; the screw shaft being mounted in bearings placed on the top of three of the frames, and in about the middle of their length. In front of the condensers come the immense gear wheels by which the power of the engine shaft is communicated to that of the screw. As these frames are bolted directly to the timbers of the ship, any diagonal strains coming upon the engines must of necessity elevate one end of the framings, and it will naturally be the weakest part that is moved, and that happens to be exactly where the shaft bearings are placed. The framings being long and disconnected, are susceptible of a small amount of spring—very small it must be—but sufficient to throw the journals enough from their proper line to cause them to heat. If, as in the *Warrior*, these frames had the additional support of the condensers, this thing would not happen, as the strength of the engines would be increased materially. The engines are heavy enough without the weight of an immense bed plate to perform an office, which, in the *Warrior*, from the advantageous position of the condensers, is performed in the most perfect manner.

ENGINEER.

THE INDIANS---GENERAL SHERMAN'S OFFICIAL REPORT.

General Sherman's Report in reference to Indian affairs we regard as a very able document. He has been unable under existing circumstances to find any lasting remedy for the war. So long as opportunities are continually offered for depredations by settlers and gold hunters upon the frontiers, the Indians will commit them. Surveys of public lands progress, railroads are built, and mail routes are established. So long as these things continue, General Sherman thinks the maintaining of our military forces on the frontier will be necessary.

The whole thing is nothing more than the old war between civilization and barbarism. Either civilization must yield and cease to progress further, or the Indians must be summarily and thoroughly squelched. It is folly to reason with these savages or to ask them to agree to the terms which have been or may yet be proposed. Any concession made to them is attributed to fear on the part of the Government, and all parleying is simply a loss of time. The terms should be dictated by the Government and enforced by it in the most peremptory and vigorous manner.

The Government should not lay itself open to any charge of breaking faith in the future. It should not pledge itself to the Indians in any manner whatever. They should not be permitted to dispute, as they have done, the progress of important internal improvements. If they will not work as citizens, they should be scattered as vagabonds. If they will not submit to the impositions of the Government, they should be made to feel the strength of its arm.

The Indians have shown themselves incapable of keeping faith. They are the most treacherous, as well as the most inhuman, of all barbarous races.

General Sherman, in his report, shows the fallacy of the belief that the recent hostilities have sprung from the abuses of the Government agents, the agent at Leavenworth being the only one who is open to any such charge. Everything goes to show that the recent outbreaks were without provocation other than the gradual advance of civilization which these red skins hate.

Believing these facts to be true, we hail with satisfaction General Sherman's recommendation to take the whole matter of adjusting the Indian difficulties out of the hands of the Peace Commissioners and restore it to the War Department, which, he says, is also the desire of the Commission itself. We believe with him that the Indians will never accede to the plans and purposes of the Commission so far as to become self-supporting, and that the best that could be hoped would be to convert them into a race of paupers.

Disagreeable as is the necessity, much as our humanity may shrink from the task, we shall never see an end to these Indian troubles until a severer code of warfare is adopted with them. We must submit to see the families of our noble pioneers tortured with the most devilish ingenuity, their wives and daughters ravished and slain by these bloodthirsty fiends, or we must slay them. For ourselves we cannot hesitate. The Government has made large appropriations to the Pacific Railroad, which the danger from armed bands of hostile Indians will render worthless when completed, unless a prompt and vigorous policy compels them to go to the reservations set apart for them and to remain there. If the Government sees fit to support them upon these reservations as paupers, we shall not object, although we fail to see any good reason for so doing.

Saving Trees Girdled by Mice.

At the February meeting of the Northern Illinois Horticultural Society, D. B. Weir, of Lacon, read a paper "On Saving Girdled Fruit Trees." He said he had over a hundred trees, seven years planted, completely girdled by mice. There had been for some time a heavy snow on the ground; and mice being plenty and in a starving condition, with nothing else to eat, they ate all the bark from the trees as far as they could reach; some of them for a foot up and down all around; and portions of the sap wood in some places half an inch deep. As soon as the damage was discovered, which was on the first thawing days, he banked the snow around the trees, and as soon as the soil thawed he banked that a foot high about the trunks.

This was all the attention they received; and to-day they have all the damaged parts covered by almost as thick a coating of bark as the uninjured portion of the trees. When the girdling is done high up on the trees, banking with soil will be impracticable. If the wounded parts are too high to reach by banking, clay may be bound on with a bandage. The sooner the surface is protected after injury the better. The death of the tree is caused by the seasoning of the sap-wood.

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OFFICIAL REPORT OF PATENTS AND CLAIMS

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FOR THE WEEK ENDING DECEMBER 1, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

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On filing each application for a Patent, except for a design.....$15
On issuing each original Patent.....$20
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In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

84,463.—WAGON BRAKE.—H. Anderson, Shepherdstown, Pa.

I claim the metallic semicircular ratchet, D D, the bar, E, and the lever, F, joined thereto by the pin, G, the small upright post, H H, passing through the end and forming the fulcrum of the lever, F, the bar, I, the rubber blocks, J J, the part, K, the rubber bar, L L and the bar, M, all constructed and combined, in the manner and for the purpose herein set forth.

84,464.—MATCH MACHINE.—Emery Andrews, and William Tucker (assignors to Star Match Corporation), Portland, Me.

We claim, 1st, The combination of the cams, d d, with the receivers and conductors, m m, in the receiving box, H, as and for the purposes specified.

2d, The combination and arrangement of the slides, o, and grooves, i, on the wheel, B, and the spring, h, in connection with the receivers and conductors, m m, in the receiving box, H, substantially as and for the described purposes.

84,465.—CAR COUPLING.—John D. M. Armbrust, Apollo borough, Pa.

I claim, 1st, Arranging within a draw head, A, a series of springs, C and C', D and D', when the same are secured by a single bolt, H, at the rear of the same, thus leaving their forward opening or mouth entirely free, substantially as described, as and for the purpose specified.

2d, The combination of the keeper, F, spring, G, plate, B, and bolt, H, when the former is secured to and works upon the spring, C, substantially as described, and for the purpose specified.

84,466.—BUREAU BEDSTEAD.—Derk Arnaud, Boston, Mass.

I claim, 1st, A folding bedstead, hinged to the bottom of the door of a case, when the side of the door is hinged to the case, so that the bedstead can be swung out to any angle, substantially as described.

2d, The arrangement of the washstand, G, and box, E, with a bureau bedstead, substantially as described.

3d, The arrangement of the several parts, A B C D E G S, and M, in one piece of furniture, substantially as described.

84,467.—EAVES TROUGH HANGER.—David Arter (assignor to himself and J. J. Kauffman), Ashland, Ohio.

I claim the button, E, in combination with the crosspiece, D, and trough, A, in the manner as and for the purpose set forth.

84,468.—METHOD OF HOLDING AND ADJUSTING DIES AND PUNCHES.—Phineas E. Austin, New Haven, Conn.

I claim, 1st, The arrangement of the several dies, clamps, wedges, and screws with the frame, as described, and for the purpose specified.

2d, The spring gage pin, F, in combination with the dies, in the manner and for the purpose specified.

3d, Arranging the punches in the punch stock, and confining them to one another by means of the block, H, and to the stock by means of the dovetailed tenons fitting into the dovetailed groove in the stock, and the wedge, all substantially as described.

4th, The connecting block, H, placed between the two punches or male dies, for the purpose of holding them together, substantially in the manner and for the purpose specified.

84,469.—BRIDLE BIT.—A. P. Baldwin, Newark, N. J. Antedated November 21, 1868.

I claim pivoting the two mouth pieces, a b, and to the cheek pieces, C, the pivots of the one being at a distance from the other greater than that of the mouthpieces, substantially as described and shown.

84,470.—ANTI-FRICTION BEARING FOR VERTICAL SHAFTS.—Rufus P. Barnett, Charles P. Purinton, and Nicholas Seibert, Nevada, Cal.

We claim 1st. In combination with the balls, H, and their guide, I, the universal joint formed by the convex surface, G, and the upper concave surface of D, substantially as described.

2d, In combination with the balls, H, and the above claimed joint, the screw, E, to adjust the same to the required elevation beneath the shaft.

84,471.—PROCESS OF RECOVERING AND REWORKING BORAX FROM SOLUTIONS USED IN TREATING WOOD.—Sigismund Beer, New York city.

I claim utilizing the liquids employed in the process of Beerizing, seasoning, or preserving wood by precipitation, substantially as and for the purposes specified.

84,472.—NEEDLE FOR KNITTING MACHINE.—Dana Bickford, Boston, Mass

I claim a knitting machine latch needle, made from a wire, and having a swell, b, thereon, as and for the purpose set forth formed by giving a bend to the wire, and without cutting away or reducing the same.

Also, a knitting machine latch needle, having a swell, a, thereon, located between the latch and the end projection, and whose elevation is on the same side with the hook, as and for the purpose set forth.

84,473.—PROCESS OF KNITTING PILE FABRIC.—Dana Bickford, Boston, Mass.

I claim the process herein described, of knitting tufted or piled fabric, the same consisting in laying between the regular course of stitches, after a course has first been knitted, a course of loose loops, formed from a continuous yarn, and then binding this last course in place by a succeeding course of regular stitches.

Also, as a new article of manufacture, a knitted fabric, in which, after a course of stitches is knitted, a course of loops, formed from a continuous yarn, is next deposited upon this row of stitches, and then another course of stitches knitted over the same, to bind and hold to place the loops or tufts.

84,474.—ANNUNCIATOR.—J. S. Birch, New York city.—Antedated November 14, 1868.

I claim the arrangement of the table boxes, A, having doors, a', the sliding tablets, C, operated by the weighted rods, B, the cashier's box, A, having a series of tablets, C, operated by the weighted rod, extended to connect with the bell hammer, H, each of said tablets connected with the cashier's tablet by means of the cords, D, and all operating in the manner described, for the purpose specified.

84,475.—RATCHET ATTACHMENT FOR HARVESTERS.—George E. Burt, and Stanley B. Hildreth, Harvard, Mass. Antedated June 2, 1868.

We claim, 1st, A loose collar or ring, in combination with the pawl, when the pawl is connected to the collar or ring in such a manner as to be operated in and out of the surrounding or covering internal ratchet gear, by the resistance arising from the inertia or friction of the collar or ring, operating substantially as described, for the purpose set forth.

2d, The bolt, e, and tightening nut, f, in combination with the friction band I, and hub, d, when said friction band is used to operate the pawl in and out of cog, substantially as described.

3d, The combination of the pawl, A, the pivot ears, i i', the link, n, and the friction band, I, substantially as described, for the purpose set forth.

84,476.—FLUID METER.—Edmund Augustin Chameroy, Paris, France

I claim the combination, with the tapering valve chamber, the weighted valve, and valve rod, connected with the counterweight, O, as described, and the pinion, M, and disk, P, mounted upon the shaft, I, of said counter weight, of the registering mechanism and the rotary plate, R, actuated by clock work under the arrangement and for operation as herein shown and set forth.

84,477.—HORSE HAY FORK.—Alonzo M. Cheney and Handley B. Kimball, Charlotte, Mich.

We claim, 1st, The bent fork shank, B, broadened at its lower extremity, b, for the connection of the bail stay bar, C, and overlapping detachable tines, A A A, substantially as described.

2d, The pivoting of the bail, D, to the bent fork shank, B, so that the axis of revolution of the fork within the bail shall be underneath the load, substantially as described.

3d, The attachment of the detachable bent fork tines, A A A, to the bent fork shank, B, at the foot, b, by the corrugated clamping bar, H, fastened by the shouldered, threaded, and nutted eye bolts, n n, and forks of the stay bar, f f, substantially as described.

84,478.—REIN HOLDER.—James Chittoch, Chicago, Ill.

I claim a clamp for fastening lines, consisting of the parts, A A', spring, C, hook, B, and pin, H, as and for the purpose set forth.

84,479.—APPARATUS FOR CONDENSING IN DISTILLING SPIRITS AND OTHER LIQUIDS.—Henry G. Dayton, Maysville, Ky., and James Christie, Atlanta, Ill.

We claim, 1st, The alternate chambers for water and vapor, which may be continued or repeated indefinitely, thus securing much greater surface for the action of water in cooling.

2d, The concave surface of the bottom of the outer vapor chamber, which permits the flow of water, striking it at or near the center, to spread in every direction from the point of contact, thus cooling the entire bottom of said vapor chamber.

3d, The creation of a partial vacuum in the vapor chamber by our superior means of cooling, which causes the vapor from the retort to flow promptly and really into the vapor chambers, substantially as described.

4th, The tubes, H H I I K K L L M, etc., for their various purposes and uses in the manner substantially as set forth.

84,480.—METHOD OF WORKING STEEL AND IRON.—Henry James Dickerson, Appleton, Wis.

I claim, 1st, The working of steel and similar substances, more readily and with better results, by the assistance of the first-described compound, applied for the purpose substantially as described.

2d, The refinement of steel and similar substances, by the application of the second compound in the manner and substantially as described.

3d, The refinement and hardening of steel and similar substances, by the application of the third compound, in the manner and for the purpose and substantially as described.

4th, The accurate attainment of the desired quality in many articles at once, by the use of the receptacle and instruments above described, in the manner and substantially as set forth.

84,481.—PRESERVING MEAT.—Julius Edmund Dotch, M. D., Washington, D. C.

I claim the preserving of the body of animals, or parts thereof, by the use of aldehyde, in the gaseous or liquid state, or mixtures of aldehyde in glycerin and phospho glyceric acid, or acetate of soda and glycerin, or simply phospho-glyceric acid.

84,482.—FILTER AND COOLER.—Nicholas Downes, Syracuse, N. Y.

I claim, as an improved article of manufacture, the combined water cooler and filter, consisting of the ice chamber, B, with the rack, G, and separate cover, e, the perforated chamber, D, connected with the chamber, B, by pipe, C, and having an outlet, h, and the casing, A, having covers, f f, and cock, H, when said parts are all constructed and arranged to operate as herein shown and described.

84,483.—MACHINE FOR FINISHING CLOTH.—John Earnshaw, East Greenwich, R. I.

I claim, 1st, An endless flexible stencil belt in combination with a nap-raising device, substantially as and for the purpose set forth.

2d, A nap raising device, convex supporting bed and continuous stencil plate, substantially as described, arranged for conjoint operation, as and for the purpose set forth.

3d, The combination of a heated work-supporting surface, a stencil plate, and a nap raising mechanism, substantially as and for the purpose set forth.

4th, The combination of a supporting bed, a stencil plate, and a shearing device, substantially as herein described.

5th, Devices, substantially as described, for applying moisture, in combination with a continuous stencil plate, arranged and operating substantially as set forth.

6th, Devices for applying coloring matter to the cloth, in combination with mechanism for working and teazling the same, substantially as herein set forth.

7th, The devices for applying the coloring matter, combined with the device for steaming or moistening the same, as herein set forth.

8th, The combination of the supporting bed, stencil plate, and nap raising device, with the shearing device, as herein described.

9th, The adjustable tension rollers, in combination with the stencil belt and the supporting bed, substantially as described.

84,484.—DOOR LOCK.—Monroe B. Foote, Northampton, assignor to himself, William M. Gaylord, E. N. Foote, New England Village, Mass.

I claim the combination and arrangement of the lever, l, with the cam and stop, f, the spring catch, k, and with the slotted bolt and its case, substantially as described.

84,485.—BRICK AND CONCRETE PRESS.—George A. Frear (assignor to Charles Holland), Chicago, Ill.

I claim the combination and arrangement of the knee-jointed levers, c c, plungers, d, cam, g, the segments and ratchets, e and w x, the bed piece, i, and partitions, k k, of the mold box, all constructed as described and to operate substantially in the manner and for the purpose set forth.

84,486.—REED MUSICAL INSTRUMENT.—Levi K. Fuller and Henry K. White (assignors to J. Estey & Co.), Brattleborough, Vt.

We claim the improved arrangement of the valve hinge, viz., along the side of the valve instead of at one end of it, as heretofore practised.

Also, the combination of the strip of leather, L, with the front valve, C, its spring, C', the back valve, G, and its lever, D.

84,487.—WASH BOILER.—Lewis Granger, Memphis, Mich.

I claim, 1st, The slides, C, provided with ribs, D, or their equivalents, when constructed and operating substantially as and for the purposes herein set forth.

2d, The comoination of the slides, C, slotted grate, F, and hooks, I, in connection with any suitable boiler, and the flanged projection, H, in connection with any suitable cover, when arranged and operating substantially as and for the purposes herein described.

84,488.—WOODEN WASHER FOR CARRIAGES.—Thomas M. Hart, New Bedford, Mass.

I claim a wooden washer made of two or more thicknesses of board, fastened together by glue or any adhesive compound, in such a manner that the grain of one shall cross the grain of the other to prevent splitting as herein specified.

84,489.—MODE OF PREVENTING CORROSION OF BOILER TUBES IN SEA-GOING VESSELS.—George Hawxhurst, Somersville, Cal.

I claim a protection from corrosion for the boilers of steamers using surface condensers, consisting of the solution herein described, and used substantially as set forth.

84,490.—CAR BRAKE.—John Hirst Jamaica, N. Y., assignor to himself and Henry A. Dirkes, New York city. Antedated November 13, 1868.

I claim, 1st, The rail brake shoe, H, attached by the connecting bar, e, to the crank, d, of the weighted shaft, D, hung in spring bearings, a, said shoe being supported in a horizontal position by means of the cords, f, all constructed, arranged and operating as described for the purpose specified.

2d, The combination of the brakes, G G, heads, F F', crank shaft, D weight, I, cords or chains, b c, rail brake shoe, H, connecting bar, e, and supporting cords or chains, f, all constructed and arranged to operate as herein described, for the purpose specified.

84,491.—WASHING MACHINE.—L. H. Hubbard, Canton, Ohio.

I claim the peculiar arrangement and combination of the sliding boxes, f 1, with ratchet dials, k k, secured thereto, the lifting levers, J J, with spring pawls, j j, and geared heads, g g, thereon, and the frame standards, H H, with cog pins, q q, the several parts being constructed, arranged, and operating substantially in the manner and for the purpose specified.

84,492.—CLASP FOR HOOP SKIRTS.—John Ingraham (assignor to himself and Chas. E. L. Holmes, assignors to Chas. E. L. Holmes), New York city.

I claim a clasp for skeleton skirts, cut out of a compound sheet of metal formed of zinc and tin, in the manner described.

84,493.—WASH BOILER.—Wm. F. Jenkins, Indianapolis, Ind., assignor to himself and James M. Myers.

I claim the rivets, a' b' c' d' f' g' and h', and the adjusting slots, a b c d e f and h, when constructed and used in the manner and for the purpose substantially as set forth.

84,494.—MACHINE FOR MAKING NUTS.—Edward Kaylor, Perrysville, Pa.

I claim in a machine for making nuts from hot bars of iron, a die box, either solid or made in separate pieces, with apertures and grooves for the admission and flow of water along the inner or working face of the die box, or of the separate dies of which it may be composed, substantially as herein before set forth.

84,495.—COAT SUPPORT.—R. C. Kelly, West Meriden, Conn.

I claim the within described coat supporter as a new article of manufacture, consisting of the arms, A and B, and the slotted connection, C.

84,496.—HOISTING MACHINE.—John Kennedy, Chicago, Ill.

I claim the combination of the weighted pawl, P, cross tree, B, pulleys, D, rack lever, F, weighted rope, W, ropes, b Z, friction wheel, E, and band, H J, the whole being arranged as and for the purpose set forth.

84,497.—MODE OF WORKING GOLD AND SILVER ORES.—Guido Kustel, San Francisco, Cal.

I claim the ingredients or agents above enumerated, added to the ores, in the manner and in about the proportions herein specified, for the purpose set forth.

84,498.—STAY FOR SHIRT BOSOMS.—J. R. Little, West Roxbury, Mass.

I claim the new article of manufacture or shirt bosom stay, as composed of the buttonholed strap, A, and the hook or attachment, C, as specified, the whole being substantially as and for the purpose set forth.

Also, the double hook attachment, C, made as and for the purpose above explained.

84,499.—CULTIVATOR AND SEEDER.—Calvin Lobdell, Fort Hill, Ill.

I claim, 1st, The leveler, K K L, arranged to operate substantially as and for the purpose herein specified.

2d, The combination of the leveler, K K L, arms, I, wings, B, rods, M G, and curved plate, R, the whole being constructed and arranged substantially as and for the purpose set forth.

84,500.—MACHINE FOR CROZING BARRELS.—John Maley (assignor to himself and Martin Dowd), Middletown, Ohio.

I claim the curved frame, A B D, and vertical guide rolls, o 1, in combination with the feed rolls, i j, and tools, e f g, for planing, crozing, and chamfering barrels, arranged and operating conjointly by the system of gearing, substantially as and for the purpose described.

84,501.—ENVELOPE.—George H. Mathews, New York city. Antedated Nov. 16, 1868.

I claim an envelope or wrapper having one or more openings cut in the flap, and having marks on that portion of the body of the envelope beneath the flap, substantially as and for the purpose set forth.

84,502.—FLOAT FOR BOILERS.—Henry McGann, Cleveland, Ohio.

I claim the globular frame, C, in combination with the shell, A, substantially as herein specified.

84,503.—SEAL BOLT FOR RAILWAY CARS.—Jasper P. Moore, Boston, Mass., assignor to Andrew B. Uline, and said Uline assignor to himself and Gardenir G. Kidder.

I claim the combination of a bolt and a tongue pivoted to such bolt, the same having one or more holes to receive a seal for the purpose of holding the tongue at any angle with the bolt.

Also, the combination and arrangement of the shouldered head with the bolt and tongue pivoted together, and having one or more holes, as described, to receive a seal for the purpose as set forth.

84,504.—SASH HOLDER.—John Obreiter (assignor to himself and Andrew Leibly), Lancaster, Pa.

I claim the construction and arrangement of the sash holder plate, A, with its open slot, b, and curved bearings, c, in combination with the drop latch, B, bifd head, e, fulcrum arms, d, and side lever, f, substantially in the manner and for the purpose specified.

84,505.—PAPER FILE.—L. H. Olmsted, Brooklyn, N. Y.

I claim the combination of the plate, A, with the clamps, B B, which said clamps are actuated by means of springs, substantially as shown and described and for the purpose set forth.

84,506.—CORD COVERING MACHINE.—Wm. H. Palmer, Jr., Middletown, Conn.

I claim, 1st, The within described arrangement of the belts, M and N, so as to turn several bobbins, G4 and H4, or their equivalents, by pulleys carried on the shaft, B, from pulleys mounted concentrically within the mechanism substantially as and for the purpose set forth.

2d, The covering bobbins, H4, mounted on horizontal axes, the revolving ears, A8 or their equivalents, and the open based eyes, D2, carried on the frame, D, all combined and arranged substantially as and for the purposes herein specified.

3d, The bevel gears, B1 C1 D1, the revolving frame, D, and guides, D2, the twisting spindles, G, and covering devices, H4, in combination with the concentric shaft, B, revolving in the direction opposite to the revolutions of the frame, D, and arranged to impart opposite motions to the twisting and covering mechanism, all substantially as and for the purposes herein set forth.

84,507.—HARVESTER.—L. F. Parker, Davenport, Iowa.

I claim, 1st, The pole, C, pivoted at the rear end of the main frame, and having its front end arranged to move laterally in a guide bar, D, located in front of the wheels, in combination with the cords, n o, pulley, s, and windlass, n, substantially as described.

2d, The yoke, J, attached to the main frame, A, and having the pole, C, provided with the sliding bolt, f, working therein, and operated by the cord p, arranged substantially as set forth.

3d, The rake, R, carried by the chains, K, and having the arm, w, working in the groove, x, and against the guides, k and l, when said parts are arranged as shown and described.

4th, The combination of the grain receiving reel, L, the rock shaft, b', with its arm, b'', to be operated by the rake, R, and the locking bar, a'', all constructed and arranged to operate as herein described.

5th, So arranging the rake, R, as to impart to it a lateral movement from the sickle as it passes from the upper side of the platform, and a return movement toward the sickle, as it rises to the top of the platform, substantially as described.

85,508.—BENCH VISE.—James Pickering, New Hope, Pa.

I claim the two inclined planes or slides, when combined and arranged in the manner and for the purpose substantially as herein described and set forth.

84,509.—MACHINE FOR ROUNDING BARREL HEADS.—Owen Redmond, Rochester, N. Y. Antedated Nov. 19, 1868.

I claim the combination of the loop or staple, c3, and lever, c4, with the spring latch, F, when arranged and operating substantially as described, for the purpose of causing more than a complete revolution of the clamps, c c1, to be made during the time that each barrel head is being sawed.

84,510.—GRAPPLING HOOK.—E. J. Riker, Lewiston, Me.

I claim the grappling hook as described, combining the rod, c, cross bar, a, arms, h h, hooked arms, f f, all arranged to operate as described.

84,511.—HEATING STOVE.—Isaac N. Ross, Worcester, Mass.

I claim in a stove, in which the magazine is arranged with relation to the fire pot, and combined with an annulus surrounding its lower end, and one or more air supply pipes, leading from the top of the stove as described, the formation of the air discharge apertures or perforations in the bottom, in contradistinction to the sides, of said annulus, substantially in the manner and for the purposes shown and set forth.

Also, the combination and arrangement of the auxiliary annulus, N, and its air supply pipe, and discharge holes, with the fire pot, the magazine, and the annulus, L, and its air supply pipe and discharge holes, the whole being in the case as specified.

Also the combination of the inner annular air chamber, P, and its foraminous fire-proof side, R, with the fire-pot and the hollow annulus, L, applied thereto, as and for the purpose specified.

84,512.—FARM GATE.—O. E. Seymour, Madison, Ill. Antedated September, 18, 1868.

I claim the above described combination, consisting of the hand levers, G G', rods, s s', bars, a and c, and lever, b, used in connection with the triangular bell crank, F, or its equivalent, substantially in the manner and for the purposes set forth.

84,513.—FASTENING FOR WHIP SOCKETS.—Benjamin N. Shelley, Newark, N. J.

I claim a whip socket, having connected with it a fastening consisting of the hook, a, and the screw, d, constructed and operating substantially as and for the purpose specified.

84,514.—SAW GUMMER.—A. R. Silver (assignor to himself and John Deming), Salem, Ohio.

I claim the saw gummer bar, B, herein described, constructed with a head, D, in which is a die socket, e.

84,515.—LET-OFF MECHANISM FOR LOOMS.—T. S. Smith, Charlestown, assignor to Alfred B. Ely, Newton, Mass.

I claim, 1st, The combination of the brake or pawl, J, with the shaft and finger, H, when the parts are constructed and arranged to operate together, substantially as described.

2d, The adjustable lug or finger, H h, when arranged and operating in connection with the brake or pawl, J, as a positive let-off to the yarn, substantially in the manner described.

3d, The whip roll, D, supported by sliding arms, d, in combination with the spring, c, and adjustable collar, b, constructed and arranged substantially as and for the purposes described.

4th, The whip roll supported in spring bearings, in combination, and arranged and operating in connection, with the brake or pawl, J, so as to relieve the same, and let off the yarn by means of the tension thereof, substantially as described.

5th, The whip roll, supported in spring bearings, in combination or connection with the shaft and finger, H, when the latter are arranged to operate with the pawl or brake, J, substantially as described.

84,516.—PUMP VALVE CHAMBER.—Michael C. Taylor, Grass Valley, Cal.

I claim 1st, The diaphragm, B, in a valve chamber, and the valves, C C', operated by the levers, D D', substantially as and for the purpose described.

2d. A double valve chamber, having one ingress and egress pipe, constructed substantially as and for the purposes herein described.

84,517.—CLOCK.—Silas B. Terry, Waterbury, Conn.

I claim the anchor escapement, constructed as described, with one pallet, D, having a flange, d, and the other pallet, E, bent out, whereby one pallet is made dead beat and the other recoil, for the purpose of equalizing the vibrations of larger or smaller pendulums, produced by unequal motive power, as herein shown and described.

84,518.—MACHINE FOR SAWING MARBLE.—P. J. Torney, Washington, D. C.

I claim 1st. The shafts, a a, with cog wheels, B B, and pulleys, b b, in combination with the endless chains, D D, and pulleys, d d, all constructed and arranged substantially as herein set forth.

2d, The arrangement of the shaft, I, with pulleys, J, and L L, and pinion, H, operating in combination with the pinion, G, and screw threads on the shaft, C, to raise or lower the saw frame, substantially as herein set forth.

3d, The combination of the shaft, I, cog wheel, M, and arm, N, the latter provided with a dog or pawl, O, and connected in a suitable manner with an engine for the purpose of feeding the saw while the machine is in operation, substantially as herein set forth.

84,519.—DEVICE FOR ATTACHING VINES TO TRELLISES.—Edward F. Underhill, New York city.

I claim the vine lock herein described, as a new article of manufacture, the same being adapted to be applied upon the vine and the trellis wire, and to be secured by a simple movement thereon, substantially in the manner and for the purposes herein set forth.

84,520.—MACHINE FOR PAINTING WIRE CLOTH.—Charles H. Waters, Groton, Mass.

I claim, 1st, The combined arrangement of wire cloth and mechanism, herein described, for painting wire cloth, consisting of a trough of paint in which the wire cloth is immersed, and adjustable pressure rollers, between which it is passed, and a mechanism by which the cloth, after being painted, is drawn from the adjustable pressure rollers, substantially in the manner and for the purpose specified.

2d, In connection with the combined arrangement of wire cloth and mechanism, just described, the employment of a drying room in which the cloth is suspended vertically while being dried, substantially as herein specified.

3d, In combination with the adjustable rollers, which determine the quantity of paint applied to the wire cloth, the employment of a brush, by which the meshes are cleared, substantially as described.

84,521.—MACHINE FOR PRINTING FIGURES ON WIRE CLOTH.—Charles H. Waters, Groton, Mass.

I claim the combined arrangement of wire cloth and mechanism herein described, for painting figures upon wire cloth, consisting of a roller, having the figures to be painted engraved thereon, and a pressure roll, between which rollers the wire cloth is passed, a trough of paint, and the rolls by which the paint is applied to the engraved roll, and the mechanism by which the cloth is drawn away from said rollers after the figures are painted thereon, substantially as herein described and set forth.

84,522.—SLATE FRAME.—C. Joseph Wirth, Dansville, N. Y. Antedated November 25, 1868.

I claim an attachment for school slate frames, consisting of a narrow oblong metallic box, C, the top of which, D, is hinged to the lower section, forming a cover therefor, said box being provided with narrow flanges, for attaching the same to the outer edge of the slate frame, for the purposes set forth.

84,523.—BIT BRACE.—Frederick A. Wood, Jersey City, N. J. Antedated November 19, 1868.

I claim the thimble shaped ring or clamp, D, when provided with the spiral slot, C, and the longitudinal slot, E, in combination with the ring, H, for giving to it a longitudinal motion, when constructed and arranged substantially as and for the purpose set forth.

84,524.—CHURN.—John K. Wood, Allegheny City, and David R. Speer, Pittsburg, Pa.

We claim the vertical shaft, C, with its operative mechanisms, B B1 and B2, and hollow helical dasher, C1, of the form described, with its inlet pipe C2, and outlet, C4, in combination with the frame, D, when connected to the lid, A1, as described, when constructed, combined, arranged, and operating substantially as herein described and for the purpose set forth.

84,525.—ORDNANCE AND OTHER FIRE-ARMS.—Onofrio Abbruzzo, New York city. Antedated Nov. 20, 1868.

I claim, 1st, The provision in a fire-arm of a piston, C, confined within a gun, which shall afford increased surface for the expanding gases to act upon which shall impel the projectile when the discharge takes place, substantially as described.

2d, The combination of the connected piston, C, and tube, C', with a slit barrel, A', substantially as and for the purpose set forth.

3d, The perforations, a a', in combination with the piston, C, and a projectile, F, constructed, and operating in the manner and for the purpose explained.

4th, The springs, D, in combination with the piston, C, substantially as and for the purpose explained.

84,526.—SLED BRAKE.—James M. Ackerson, La Fayette, N. J.

I claim the combination of the lever dog, A, connecting rod, D, and operating lever, E, said parts being constructed, arranged and operating substantially as herein shown and described, and for the purpose set forth.

84,527.—REVERSIBLE RATCHET FEED.—Albert B. Bean, (assignor to himself and J. H. Booth), New Haven, Conn.

I claim the double-ended pawl, constructed with the head, F, in combination with the lever, G, having the cam, H, arranged therein so as to operate to reverse the action of the pawl, substantially in the manner herein set forth.

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85,528.—APPARATUS FOR GROOMING HORSES, etc.—Richard S. Beaumont and William Clarke, Jr., Albany, N. Y.

We claim, in combination with a handled encased conduct pipe, A, the cross-head pipe, F, perforated with the escape-holes, a a, placed as described, and combined with the comb, G, in such a manner as to leave the air space, c, between the said cross-head, F, and the comb, G, and all constructed and arranged in the same manner specified, for the purposes set forth.

84,529.—HANDLE FOR FILES.—Byron Boardman, Norwich, Conn.

I claim the cylindrical ferrule, B, handle, A, and plug, C, when each part is constructed and arranged, with relation to the others, to operate in the manner and for the purpose substantially as described.

84,530.—WINDOW BLIND SLAT HOLDER.—James Boyd, Maroneck, N. Y., assignor to himself and N. C. Garretson, New York city.

I claim the slat-fastening device, consisting of the sliding crank-arbor, G, held in the ears, E and F, and combined with the lever, H, spring, I, and notched ridge, c, all made and operating substantially as herein shown and described.

84,531.—COUPLING FOR THE HOUNDS AND POLES OF WAGONS.—Frederick Bremerman, Indianapolis, Ind.

I claim the device composed of the segment, E, bed or chamber, F, with flanges, H, when constructed and arranged substantially in the manner and for the purposes set forth.

84,532.—CHURN.—A. P. Bryson, Prospect, Pa.

I claim the combination and arrangement of the oblique wings, a a, and concave, perforated, revolving dasher, A, substantially as and for the purpose herein specified.

84,533.—WATER METER.—Isaac Carey, Warwick, N. Y.

I claim, 1st, The tilting-box, B, divided into two compartments, D D', with the boxes, F F', fitted within said compartments, and provided with valves. G G, the boxes, F F', communicating with the tube, C, by the pipes, d d', in connection with the tilting-bars or valves, I I', arranged in relation with the discharge pipes, c c', to operate in the manner substanially as and for the purpose set forth.

2d, The mercury tubes, J J', applied to the tilting bars or valves, I I', substantially as and for the purpose specified.

84,534.—FURNACE FOR DESULPHURIZING STEEL AND OTHER WIRE.—Alanson Cary, New York city.

I claim, 1st, A furnace for desulphurizing wire or other articles or substances, constructed with valve openings between the combustion and desulphurizing chambers, whereby the heat of the fuel has direct access to the wire or other article to be desulphurized, substantially as described.

2d, The chambers, A and B, with valve-openings between them, substantially as described.

3d, The door, H, when the same is hung and operated substantially as described.

84,535.—STREET LAMP.—O. Case and B. D. Evans, Columbus, Ohio

We claim, 1st, The arrangement of the reservoir, B, and perforated shield B, in the frame of the lamp, substantially as and for the purpose described.

2d, The combination, with the reservoir, B, arranged within an air-chamber, of the pipes, F, communicating with the exterior of the lamp, substantially as and for the purpose described.

84,536.—LIFTING-JACK.—John Q. Crosby, Northborough, Mass.

I claim the rollers, G, in combination with the lever, F, substantially as described for the purpose specified.

85,537.—BASE-BURNING STOVE.—Stephen Culver, Newark, N. Y.

I claim, 1st, The air chamber, f, in shape of a frustum of a cone, surrounding the magazine, and provided with air-inlet passages from the base of the stove, and a narrow throat between its lower end and the mouth of the magazine, substantially as and for the purposes set forth.

2d, Operating the covering of the hopper, through which the magazine is supplied, by means of the concealed hinge, herein described, constructed and arranged substantially as specified.

3d, Communicating to the fire grate both a rotary and horizontal movement, by means of the divided axle, herein described, constructed and operated as specified.

84,538.—DAMPING-TROUGH.—Henry Thomas Davis, New Cross, Great Britain.

I claim an apparatus for supporting and moistening the damper or brush of a letter copying press, when constructed and arranged substantially as herein set forth.

84,539.—CHEESE-CUTTER.—J. G. Drehér, M. D., Pine Grove, Pa.

I claim, 1st, A cheese cutting apparatus, consisting of a circular or other formed table, A, provided with the slots and rollers and a knife, H, substantially as and for the purpose described.

2d, The combination, with the table, of the pins, D or D, guides, P, and vibrating hand pall, E, all substantially as and for the purpose described.

3d, The arrangement, with the knife, pivoted on the stud, K, of the guide, M, substantially as and for the purpose described.

4th, The combination, with the table, A, and the knife, of the stop, N, when all arranged substantially as and for the purpose specified.

84,540.—HORSE HAY-FORK.—Roland S. Frame, Washington, Ohio.

I claim the levers, E D, in combination with the plates, A, and connecting-rod, B, arranged and operating as described, for the purpose specified.

84,541.—LAND-ROLLER.—Daniel Fuller and Delos Swain, Oakwood, Michigan.—Antedated November 28, 1868.

We claim the arrangement of the rollers, C E D, lever, e, arms, f and i, levers, b b, and brake, h, in the manner set forth, and constructed and operating substantially as specified.

84,542.—LAMP-WICK TUBE.—Frank H. Fuller and Oren S. Severance, South Boston, Mass.

We claim the combination, with a lamp wick tube, of isinglass lining, substanially as and for the purpose described.

84,543.—ROCK-DRILLING MACHINE.—Robert Gidly, Freedom Plains, N. Y.

I claim, 1st, The frame, C D E F, of a rock drilling machine, when such frame is made adjustable around the axis of the beam, C, and around the pivot, g, substantially as herein shown and described.

2d, The legs, B, pivoted by the pin, b, to the side of the frame, A, the outer end of said pin having an eye, a, in which the legs are adjusted vertically, as herein described for the purpose specified.

3d, The combination of the winged wheel, I, with the up-and-down as well as with the laterally moveable bar, M, from which latter the pins, l and m, project as set forth.

4th, The up-and-down as well as the sideways moving bar, M, in combination with the lever, J, spring, L, rod, N, rack, o, and ratchet-wheel, p, all made and operating substantially as herein shown and described.

5th, Imparting an intermittent rotary motion to the drill shaft, N, by means of the sliding pinion, p, horizontal rack, o, and vibrating bar, M, arranged and operating as herein shown and described.

84,544.—HORSE HAY FORK.—J. A. Glenn, West Middlesex, Pa.

I claim, 1st, The arrangement of the elongated draft bar, A, and its hook, B, bar, E and hook, D, with lever, G, bar, F and rope H, all constructed and operating as herein shown and described.

2d, the arrangement of the lever, G, rope, H, handle, C, pulley, d, and slotted and curved bar, F, all substantially as herein set forth.

84,545.—SHIFTING-JACK FOR CARRIAGE THILLS.—Albert W. Hart, Stockport, N. Y.

I claim the forwardly projecting holders, D D', supporting the single shank jacks, C C', as arranged with the separated clips, B B', as and for the purpose described.

84,546.—THRESHING MACHINE.—Hugh Hanna, Pittsburg, Pa.

I claim, 1st, A cylinder or threshing reel, B, having beaters, b b', arranged traversely in pairs, and one beater of a pair to project beyond its partner, substantially as and for the purpose set forth.

2d, The adjustable concave, C, constructed of sections or bars, C', bent plates, N, removable blocks, n, projection, c, plates c2, wires, c1, rod, J, and bolts, K K1 K2, combined and adapted to operate as and for the purpose set forth.

3d, The retarding and separating roller, H, h, applied and operating substantially as described.

4th, The combination of the cylinder, B, the adjustable concave, C, the retarding roller, H h, and the feed roller, F f, all arranged within the frame or casting, A, as herein described and represented.

84,547.—HARROW.—C. Hanson, Owatonna, Minn.

I claim an improved harrow frame, formed by the combination of the curved side bars, A, brace straps, B, cross bars, C, teeth, E, and brace straps D, with each other, substantially as herein shown and described, and for the purpose set forth.

84,548.—BOX FOR CARRIAGE WHEELS.—Charles H. Holdredge, Westerly, R. I.

I claim, 1st, the box, C, of uniform exterior diameter, provided with the transverse notches or grooves, a, and the radial wedge-shaped projections, G, formed upon the flange, E, substantially as described, for the purpose specified.

2d, The box, C, secured within the hub, A, by means of the transverse notches, a, and keys, b, and prevented from turning therein by means of the wedge-shaped projections, G, fitting within recesses in the end of said hub, substantially as herein shown and described.

3d, The combination of the box, C, wedge shaped projections, G, and the transverse keys, b, with the hub, A, substantially as described, for the purpose specified.

84,549.—IRONING TABLE.—Ophelia C. Hotchkiss, Cortlandville, N. Y.

I claim the combination of the beds, a and B, with the frame, c c', and dowels, d d, arranged and operating as and for the purposes specified.

84,550.—COMPOUND FOR COATING THE OUTSIDE WALLS OF BUILDINGS.—J. S. Houghton, Philadelphia, Pa.

I claim the chemical compound, consisting of the above mentioned ingredients, and variable proportions of the same ingredients, to be applied with brush, for coating and coloring the exterior brick, stone, and mortar walls of buildings, substantially as above described.

84,551.—HORSE RAKE.—A. B. Johnson, Washington, Ind.

I claim, 1st, Hanging the wheels, B B, to adjustable stirrups, a a, fastened on the middle of the side framing, A, arranged as and for the purpose specified.

2d, The combination of the toothed wheel, d, the pawl, h, and the lever, g, arranged substantially as and for the purpose herein described.

3d, The rod, h, combined with the slide, k, and the spring, m, arranged and operating as and for the purpose set forth.

84,552.—KNIFE CLEANER.—A. C. Kaiser, Vienna, Mo.

I claim, 1st, The combination of the bed plate, B, its seats, b, with cushioned rollers, D, when arranged and operated substantially as described and set forth.

2d, The bed plate, B, in combination with the driving shaft, C, resting in adjustable pillar blocks, A 1, and connecting rod attachments, B2 b1 b2, substantially as and for the purpose set forth.

84,553.—CALK SHARPENER.—Henry Kime, Marshalltown, Iowa.

I claim an instrument for cutting off the points of horseshoe calks, constructed substantially as shown and described consisting of the nip plate, E, having the lever extension, d, and point, f, in combination with the recessed handle, B, and operated upon by the lever, D, substantially as set forth

84,554.—CHALK LINE REEL.—Martin V. B. Knowles, Wakefield, R. I.

I claim, 1st, The combination of the spring, a, reel, x, chalk line, z, and chalk box, D, through which the line passes, substantially as and for the purpose set forth.

2d, The hook, composed of the forked bar, f, tongue, q, and spring, v, substantially as described, and for the purpose set forth.

84,555.—BUTTON.—Joseph Koberle, St. Louis, Mo.

I claim, 1st, Unfolding and folding the wings, G, by a thumb-piece, B, or pressure slide, c, from the outer button surface, substantially as set forth.

2d, The lever, C, operating in the lock-slot e, of the plate, E, by the tappet, c2, substantially as and for the purpose set forth.

3d, The plate, E, its tappet, e2, the plate, f, its slots, f1, and shaft, F, operating the teeth, f2 and wings G, substantially as set forth.

84,556.—LANTERN.—Thomas Langston, Brooklyn, N. Y.

I claim fastening the upper and lower parts of a lantern together by means of clasps, D D, pivoted to the flange, a, on the base, and working over said flange, and over the ring, d, on the upper part, said ring having the guards, c c, attached thereto, and setting inside the rim, b, on the flange, a, substantially as herein set forth.

83,557.—THRESHING MACHINE.—Elijah Lindsley, Neenah, Wis.

I claim, 1st, The cylindrical sieve, D, provided with bent teeth, i i, along its ribs and resting on four rollers, C C, which are placed, one near each end of the two shafts, B B, and one of said shafts being turned, imparts the necessary rotary motion to the sieve, substantially as herein set forth.

2d, The arrangement of the frame, A, sieve, D, and inclined board, J, as and for the purposes set forth.

3d, The wind boards, H H, arranged as described, between the fan and the sieve, for the purpose of regulating the draft to the latter, substantially as herein set forth.

4th, The arrangement of the spout, K, rod, f, and wheel, L, constructed and operating substantially as and for the purposes herein set forth.

84,558.—WATCH KEY.—William Lindon, New Haven, Conn.

I claim, in combination with the key, A, the plate, B, pivoted to the key, and bent so as to cover the barrel, and arranged thereon so as to be turned to and from the barrel, as and for the purpose specified.

84,559.—HORSE HAY FORK.—Abraham W. Lozier, New York city.

I claim, 1st, The combination and arrangement, with the bar, A, and rigid time, B, of the moveable tine, C, and tripping lever, E, the whole constructed and and operating substantially as described, and for the purpose set forth.

2d, The horizontal bar, A, rigid time, B, moveable time, C, and tripping lever, E, in combination with the lever handle, F, the whole constructed and operating substantially as described.

3d, The combination of the bar, A, and tines, B and C, with the supplementary tine, D, for holding load of hay with greater security, substantially as described, and for the purpose specified.

4th, So constructing the supplementary tine, D, and that it may be used as a gauge for taking up the desired quantity of hay, substantially as described and specified.

5th, the projecting pivot, f, in combination with the tine, C, and bar, A, substantially as described, and for the purpose set forth.

84,560.—HAY LOADER.—Abraham W. Lozier, New York city.

I claim, 1st, the combination, with the upright standard, A, of the arm, B, connecting arm, C, and the hook, F, the whole constructed and operating substantially as described.

2d, The combination, with the upright standard, A, and arm, B, provided the arm, C, of the mechanism, for holding the arm in place on, and releasing it from the upright while loading and discharging the load, substantially as described and specified.

3d, The combination, with the upright, A, and the arms, constructed substantially as described, of the pin clevis wheel, for elevating the load, substantially as described and specified.

84,561.—COMBINED BRISTLE WASHING AND COMBING MACHINE.—Louis F. Lannay, Indianapolis, Ind., and William F. Parks, Baltimore, Md.

We claim, 1st, The combination, with the washing apparatus, A, C, of the combs, E, substantially as and for the purpose described.

2d, The combination of the same, when the combs are arranged to have the longitudinal and oscillatory movements, or either separately, substantially as and for the purpose described.

3d, The combination with the reciprocating frame, A, of the pawl lever, O, pawl, N, wheel, M, levers, H G, and the combs, all substantially as and for the purpose described.

4th, The combination, with the combs, E, of the arms, S, and springs, R, substantially as and for the purpose described.

84,562.—MACHINE FOR POINTING HOOKS, STAPLES, etc.—Wesley Malick, Tidioute, Pa.

I claim the frames, M M and F, the sliding boxes, L L, and the set screws, N N, in combination with the wheels, E and C, the rollers, D 1 and D2, the adjustable hopper, A, and the male and female dies H and P, when the same are constructed and arranged as described, and in the aforesaid combination.

84,563.—PLOW.—George W. Marsh, Clinton, N. C.

I claim the combination, with a plow, A, of a harrow attachment, arranged and operating substantially as herein described and represented.

84,564.—BOOK BINDING.—Luciene G. Matthews, New Albany, Ind.

I claim the combination of the book, A, with the cover B, when the same are connected together by one or more pocket and tucks, substantially as and for the purpose described.

84,565.—ANCHOR.—Edmund P. McCarthy and James Johnston, San Francisco, Cal.

We claim the arm, G, having the cam, I, in combination with the arm, D, with its flukes, J J, and the projections, c c, or an equivalent device, operating the arm, G, by means of the cam, the whole constructed and arranged substantially as herein described.

84,566.—BREECH LOADING FIRE-ARM.—Isaac M. Milbank, Greenfield Hill, Conn.

I claim, 1st, The lever, q, actuating the firing pin as the breech is opened, in combination with the sliding hammer and bolt, substantially as and for the purposes set forth.

2d, The movable block, m, in combination with the hammer, h, bolt, b', and spring, k, as and for the purposes set forth.

3d, The trigger lock, formed of the spring, t', swinging block, t, and projection, u, in combination with the trigger, d, for the purposes and as set forth.

84,567.—WAGON JACK.—James Moody, Harwich, Mass.

I claim the wagon jack, constructed as described, of the base block, a', parallel side bars, a1, provided with vertical slots, and carrying the notched block, b', the intermediate parallel bars, B, slotted vertically, the interior parallel bars, C, having the curved slots, the fixed pin, E, sliding pin, F, and lever, D, all operating as described, whereby as the bars, B C, and pin, F, are raised by the depression of the lever, the bars, C, are thrown rearward, locking the lever, D, in position, for the purpose specified.

84,568.—CORN PLANTER.—Q. R. Moor, Peter Moor, and E. L. Patrick, Forest Hill, Ind.

We claim, 1st, The arrangement of the boxes, E E, grain boxes, F F, and the slides, G G, all constructed as described and operating substantially as and for the purposes set forth.

2d, The wheels, H H, constructed as described, and held on the driving wheels, B B, by means of the slotted blocks, I I, and provided with a series of rounded blocks, J J, on their inner sides, for the purpose of operating the slides, G G, substantially as herein set forth.

3d, The arrangement of the lever n, rods, m m, and springs, l l, for the purpose of the slides, G G, in and out of gear, to be operated or not by the wheels, H H, as may be desired, substantially as herein set forth.

84,569.—AUTOMATIC GATE.—Thomas J. Murphy, Rochester, N. Y. Antedated November 18, 1868.

I claim, 1st, The swinging lever, E, in combination with the slide, D, elbow levers, C, rod B, and lever, A, substantially as and for the purpose described.

2d, The swinging lever, E, in combination, with loops, F H, elbow levers, G I, N, rods, K M, and levers, L O, substantially as and for the purpose described.

84,570.—ROAD SCRAPER.—Daniel Neff, Amsterdam, N. Y.

I claim the self-adjusting reach, having a swiveled metal bolt embedded horizontally therein, to be used as a connection for and in combination with a scraper, d d d, and carriage, a a a a, constructed substantially the same as described in the foregoing specification.

84,571.—CORN DROPPER.—James Nevison, Morgan, Ohio.

I claim the case, A, slide, C, springs, G, as arranged in combination with the sack or bag, I as and for the purpose specified.

84,572.—MILK PAIL.—Solomon Oppenheimer, Peru, Ind. Antedated November 30, 1868.

I claim, 1st, The lever, C, having movable swivel hinges, as shown at L, for the purpose specified.

2d, The rod, O, when constructed as shown, having shoulder, z, and cap, x, for the purpose shown and explained.

3d, A handle on the milk pail for the rod to pass through, having a pipe connected with it, in a manner as shown.

4th, The combination of all the above described, when constructed as shown, and used and applied on a milk pail.

84,573.—TOP PROP FOR CARRIAGES.—William B. Pardee, New Haven, Conn.

I claim, 1st, A top prop bolts constructed with the T-shaped head, D, so as to be secured upon the bow by the ends of the said T, substantially as set forth.

2d, In a top prop in which a sleeve, E, is passed over the bolt, the nut, F, arranged so as to secure the parts, substantially in the manner and for the purpose specified.

84,574.—COMPOSITION FOR CATTLE FLOOD.—Edward Payne, London, England, assignor to himself and Edward Chaplin, Montreal, Canada.

I claim, 1st, The improved composition for cattle food, by mixing refuse of grain, either before or after distillation, or other pulp, the residuum of analogous processes, with linseed meal, pease meal, bran, or other farinaceous and aromatic substances, substantially in the manner and proportions described.

2d, The use of the refuse matter, when treated in the same manner, but without the addition of the other substances.

84,575.—CULTIVATOR.—S. G. Peabody, Champaign, Ill.

I claim, 1st, An arrangement of mechanism by means of which the direction of the wheels, F, may be changed by the lateral movement of the plow beams, H, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the bushes or tubes, C, swiveled shaft or axle, E, gear wheels or segments of gear wheels, J K, and swiveled shaft, G, with each other, and with the wheel, E, cross bar, B, and plow beams, H, substantially as herein shown and described and for the purpose set forth.

84,576.—ROCK DRILL.—George Phillips, Cadet, Mo.

I claim, 1st, The slide bar, H, with its diagonal slot, a, and the lever V, with a slotted head, P, both constructed and operated substantially as shown and described, in combination with the stud, n, for the purpose of operating the valve of a drilling machine by the piston rod of the same, all as set forth.

2d, The ratchet pinion, o, in combination with the ratchet rod, M, slide plate, H, lever, V, and piston rod, F, of a drilling machine, all operating substantially as shown and described, to rotate the drill, G, of a drilling machine, in the manner set forth.

3d, The projections, h and g, of the plates, I and N, substantially as shown and described for the purpose of forming guides for the guide rod, L', all as set forth.

4th, The plate, I, and uprights, U U, of a drilling machine, in combination with the cylinder, A, of the same, substantially as and for the purpose shown and described.

84,577.—APPARATUS FOR RAISING WEIGHTS.—Jonathan Pickering, Stockton-on-Tees, England.

I claim, 1st, An apparatus for raising weights, and for other purposes, consisting of a frame, h, having mounted therein on an axle or shaft, l, a chain pulley, c, provided with an eccentric or pin, e, having a planet wheel, d, thereon, gearing into and rotated by a stationary wheel, f, and also gearing into and turning a loose wheel, g, the stationary wheel acting as a fulcrum for the planet wheel in giving motion to the loose wheel, all constructed and arranged to operate as herein described.

2d, The chain pulley, c, with its eccentric, e, having mounted thereon a planet wheel, d, in combination with a fixed wheel, f, or their equivalents, for giving motion to a loose wheel, g, or its equivalent, when constructed and arranged to operate as herein described and for the purposes set forth.

84,578.—MACHINE FOR MANUFACTURING PARCELING.—Jos. H. Raynard, Lynn, Mass.

I claim, 1st, in the manufacture of parceling or tarred canvas covering for ropes, seams, etc., in vessels, the employment of a machine, substantially as herein described; that is to say, consisting of cutting and drawing and pressure rolls, in combination with an interposed tank for the tar in which the material is immersed, and bobbins and spools upon which the prepared canvas is wound in rolls, the said parts being constructed and arranged for joint operation, as shown and set forth.

2d, The combination of the tank, c, and slide, n, constructed as described, with the pressure and cutting rolls, in the manner and for the purposes specified.

84,570.—DEVICE FOR MEASURING SKIRTS.—L. G. Rice, Montague, Mass.

I claim the combination of the cords, I, or equivalent, the spring, F, and hoop, H, with the base, B, frame, A, and cover, G, whereby, as the waist, E, is adjusted upon the frame, the tension of the cover is preserved, substantially as described for the purpose specified.

84,580.—MAMMALIAL LININENT.—Sarah Rueger, Kansas City, Mo.

I claim the combination of the materials, in the proportions and in the manner herein described, and for the purpose set forth.

84,581.—SPRING BED BOTTOM.—Hiram Russel and Myron S. Fuller, Nashville, Mich.

We claim the journal slats, A, supported in bearing blocks, b, in combination with the elastic webbing, w, and recesses and keys, D, in the cross bars, C, substantially as and for the purpose specified.

84,582.—PROCESS FOR THE PREPARATION OF WOOLEN CLOTHS FOR DYEING.—William H. Salisbury, Lawrence, Mass.

I claim, in the preparation of cloth for dyeing by boiling, the exposure of both surfaces of the cloth, while in a state of tension, and submerged in a suitable vessel, freely and equally to the action of boiling water or steam, in the manner above described, or by any equivalent means of producing that result.

84,583.—ANVIL FOR FORMING HORSESHOE CALKS.—Robert Saylor and Eli T. Rhodes, Marshall, Mich.

We claim the double-inclined anvil plate, A, having a transverse groove and slot, e, in combination with the standard, B, substantially as and for the purpose set forth.

84,584.—STAIR ROD.—Thos. Sargeant, Williamsburg, N. Y.

I claim the fastening device, consisting of the slotted socket, C, and the movable knob, G, having its pin, h, in combination with the stair rod, A, and socket, B, all arranged as described, for the purpose specified.

84,585.—BLIND STAPLE.—J. B. Sargent, New Haven, Conn.

I claim, as an improved article of manufacture, the herein described staple constructed with the corrugations extending from or near the base of the point, f, and increasing in depth, and so as to spread the metal from the point and with or without the indentation, d, as set forth and described.

84,586.—STEAM EXHAUST REGULATOR.—Joseph Shackleton, Rahway, N. J.

I claim the arrangement of the valve, D, with its conical cup seat, C, the stem, E, cap, F, projection, G, tube, H, spring, I, disk, J, screw, K, and check nut, L, substantially as herein set forth.

84,587.—BOILER FLUE CLEANER.—George V. Sloat, Morrisania, N. Y.

I claim the chipping head, A, with one or more cutting edges, D, on either side of the head, B, when arranged in reference to the shank, C and cross piece, D, substantially as described.

84,588.—CULTIVATOR.—A. B. Spies (assignor to John K. Journey), Sterling, Ill.

I claim, 1st, Connecting the frame, E, to the axle, A by means of the roller, I, link, H, yoke, J, and clevis, e, all arranged as and for the purpose set orth.

2d, The lever, K, applied to the frame, E, and axle, A, in the manner substantially as and for the purpose set forth.

3d, The curved bar, L, attached to the axle, A, swivel pulley, M, clevis, s, rope or chain, N, and bar, O, all combined and arranged to operate in the manner substantially as and for the purpose set forth.

84,589.—SEWING MACHINE.—Jonathan Sprague, Ann Arbor, and Alva T. Hill, Pontiac, Mich.

We claim, 1st, The combination with the sliding holder, b, of the vibrating lever, e, slide, l, and cam grooved plate, f, provided with the spring, K, substantially as and for the purpose described.

2d, The combination with the cam grooved plate, f, of the elliptical spring, K, substantially as and for the purpose described.

84,590.—ANIMAL POWER.—Thomas Starr, New Lisbon, O.

I claim, 1st, The web, C, consisting of the strips or belts, r, having the slats b, and beveled blocks, m, connected thereto, and arranged as described.

2d, Adjusting the rear end of the frame, B, vertically, by changing the position of its supporting pin in the holes, C, of the frame, A, substantially as herein described, for the purpose of giving any desired incline to the web, C, as set forth.

3d, The adjustable roller, h, and notches, o, of the frame, B, when constructed and arranged substantially as described, to compensate for the stretching of the web, C, as set forth.

84,591.—HAY CARRIER.—Hiram C. Stauffer, Beaver township, assignor to George Smith, Poland, Ohio.

I claim the slotted block, A, constructed and arranged as described, in combination with the trip catch, c3, constructed and arranged as described for the purpose set forth.

84,592.—LIFE LINE FOR SEA BATHING.—William Tell Street, Frankford, Pa.

I claim the combination of the masts, A, gaffs, D, stays, G, life lines, J, piles, H, and anchors and buoys, I K, either or both, and cork lines, L M, with each other, substantially as herein shown and described, and for the purpose set forth.

84,593.—APPARATUS FOR MOLDING POTS AND CRUCIBLES.—Robert Taylor, and Frederick Strow, Philadelphia, Pa.

We claim the arrangement herein described, of the rack and pinion, with the vertical and horizontal slides, and their adjustable collars, all in relative connection with the rotating mold, substantially as shown and set forth.

84,594.—CORN PLANTER.—Francis Van Doren, Adrian, Mich.

I claim the recessed shuttle, E, in combination with the adjustable slide, a, seed chamber, C, and plunger, A, all constructed in the manner substantially as set forth and described.

84,595.—SHINGLE STOOL.—Francis Van Doren, Adrian, Mich.

I claim the combination of the seat, S, the metallic bars, m n, bent to form legs of unequal length, and the four serrated wheels, a a' b b', all constructed, arranged, and employed in the manner and for the purpose herein specified.

84,596.—SASH FASTENER.—William M. Warren, and Charles A. Warren (assignors to the Warren Manufacturing Company), Watertown, Conn.

We claim, 1st, The combination with the locking pinion, C, of the locking pin, F, arranged to be withdrawn, and held by means of inclined grooves, K and L, when a rotary movement is communicated to it, as arranged and shown, and for the purpose described.

2d, The combination, with a spring actuated balancing pinion for sash fastening, of a detachable winding apparatus, with its hook, D, pin, Q, and frame, arranged as and for the purpose described.

84,597.—WASHING MACHINE.—Le Roy B. Wheeler, Madison, Wis.

I claim the cylinder, P, with the stops or triangular pieces, a b, constructed as described, and provided with a string and button, for holding and alternating the clothes, so as to wash them on both sides, in combination with the concave or rollers, E E, all constructed, arranged, and operated in the manner and for the purpose set forth.

84,598.—MAGAZINE FIRE-ARM.—Luke Wheelock (assignor to Winchester Repeating Arms Company), New Haven, Conn.

I claim the auxiliary sere, d, combined with the hammer and trigger guard, and principal sere, so as to operate substantially in the maneer herein set forth.

84,599.—FELTING HATS.—Milton D. Whipple, Cambridge, Mass.

I claim, 1st, The process herein described of forming hats, by felting the same into proper shape from a flat circular piece of suitable material, by a continuous automatic operation, substantially as set forth.

2d, The combination of the manipulators, r r', with the conical rollers, as and for the purpose described.

3d, The combination, with the conical rollers, of the mold, b, and movable disk, c, substantially as and for the purpose set forth.

4th, The combination of the disk, c, rod, e, and spring, e', with the cam, substantialy as and for the purpose described.

84,600.—CHIMNEY.—August Wilhelms, St. Petersburgh, Russia.

I claim the rectificator, A, with the biconical deflector, C, at the lower part of the chimney, in connection with the deflector, F, and spherical frame E, covered with an iron grating, d, on the top of the chimney, all constructed and arranged substantially as and for the purpose set forth.

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84,601.— WAGON HUB.—Alonzo S. Woodward, Pepperell, Mass.

I claim, 1st, The hollow cast metal hub, composed of the parts, A C, and B, the latter having the box cast thereon, and the whole fitted together as described, and held by bolts, a, all as set forth.

2d, The packing rings, e and f, and packing strips, k, substantially as described, in combination with the hollow cast metal hub, as above set forth.

3d, The part, B, of the hub, provided with the inclined lubricating hole, n, when said hole is closed by the perforated cap, p, and the elastic packing disk, q, as herein described, for the purpose specified.

84,602.—PROPULSION OF VESSELS.—Albert F. Yardell, San Francisco, Cal.

I claim, 1st, The bar or tank, C, capable of containing cargo, arranged and operating substantially as described, for the purpose of communicating motion to the propeller of a vessel.

2d In combination with the tank, C, the rod, I, segment, J, pinion, K, gears, L L1 L 2, ratchets, P, and pawls, P', arranged and operating substantially as described, to give a rotary motion to the shaft, M.

3d, Interposing a coiled spring, S, between the power shaft and the propeller shaft, for the purpose of equalizing or continuing the action of the power upon the propeller, substantially as described.

84,603.—WAGON SEAT.—Charles W. Aikin, Decatur, Ill.

I claim, 1st, The springs, C, with triangular blocks, c, formed at their lower ends, in combination with a wagon seat, substantially as and for the purposes set forth.

84 604.—CORN PLANTER.—J. M. Allison, Cranberry, Pa.

I claim a corn planter, having marking plows, A, rollers, B, D, and E, with pins, a, covering plows, b, casters, c, lever, d, rods, e and g, and their duplicates, as described, and springs and pins, h, operating with slides at the bottom of the sed boxes, all constructed, arranged, and operating substantially as herein specified.

84,605.—WRENCH.—William Baxter, assignor to himself and William D. Russell, Newark, N. J.

I claim, 1st, An adjustable S-wrench, composed of two parts, mortised and tenoned together in the manner and for the purposes described.

2d, The combination with the two mortised and tenoned parts of the S-wrench, of a right and left hand screw, and thumb piece to operate it, substantially as and for the purposes set forth.

3d, The construction and combination of the two parts composing the S-wrench, each being provided with a tenon and mortise, arranged on opposite ends, so that the plane of movement of the two parts shall be in the direction of the length of the wrench, and at right angles ar transversely to the jaws, as set forth.

4th, The combination in an adjustable S-wrench, as described, of scales upon the divided wrench shank, with the right and left hand screw and thumb-piece, arranged wishin a recess formed in the two parts of the taid shank, as and for the purpose set forth.

6th, The tenons formed upon and at right angles to the inner jaws, in combination with the corresponding mortises in the heads of the outer jaws, substantially as and for the purposes herein shown and set forth.

6th, The construction and arrangement of the larger and smaller jaws of the wrench, so that, when the smaller jaws are completely closed, the larger will be open to the maximum extent of the former, as and for the purpose set forth.

7th, The formation of the mortise and tenon in the body of the divided shank of an adjustable wrench, and upon that side of the division line between the two parts of the shank nearest the jaws, substantially as and for the purposes set forth.

84,606.—MODE OF PREVENTING THE COUNTERFEITING OF Bank Notes.—Sigsimund Beer, New York city.

I claim making a bank note or other printed article inimitable, substantially in the manner and by the means described.

84,607.—STEAM GENERATOR.—George W. Blake, New York city.

I claim, 1st, The arrangement of the hollow headers, G and F, with the pipes M, bent as described.

2d, The hollow headers, G and F, of corrugated construction on their sides to admit of the alternate triangular arrangement of the pipes, and to form a close joint with the adjacent header, as shown and described.

84,608.—VENTILATION.—George W. Blake, New York city.

I claim, 1st, The arrangement of radiators within the room flues, substantially as and for the purpose or purposes herein set forth.

2d, The combination, with the fresh-air shaft, and radiator, arranged within the room flues, as described of a valve, operating automatically, to prevent an upward current being established through said shaft, but freely admitting of a downward one through the same, essentially as specified.

84,609.—APPARATUS FOR MAKING EXTRACTS AND DECOCTIONS FROM COFFEE AND OTHER SUBSTANCES.—Louis Brauer, Washington, D. C.

I claim, 1st. The apparatus herein described, composed of the two vessels, a and b, the outer vessel, a, surrounding the bottom and sides, or lower portion, of the vessel, b, substantially as described.

2d, The vessels, a and b, united by means of flanges or their equivrlent, so as to be united or detached at will, substantially as described.

3d, The funnel-shaped mouthpiece, h, with closely-fitting stopper, in combination with the vessels, a and b, substantially as described.

84,610.—CORN SHELLER.—James A. Cauldwell, Horseheads, New York city.

I claim the corn sheller, as composed of the drum, F, with convex surface and armed with teeth; the concave sectional shell, K1 K2 K10, also armed with teeth, and perforated between the teeth; the springs, s s; the sieve, T T, with the attachment for shaking the same; the fan, P; all constructed for the purpose as specified.

84,611.—CULTIVATOR.—Isaac H. Chappell and James Montgonery, Decatur, Ill.

We claim, 1st, A cultivator, the draft pole and plow frame of which are pivoted on the seat-bar, substantially as and for the purposes set forth.

2d, The attachment of the draft pole to the seat-bar, by means of the pin, a, pivoted in slot, c, and nut. d, substantially as and for the purposes set forth.

84,612.—SCABBARD FOR TROWEL BAYONET.—Felix Chillingworth, Springfield. Mass.

I claim a scabbard for trowel-shaped bayonets, constructed and arranged as described.

84,613.—APPLICATION OF CARBONIC ACID IN FIRE ENGINES.—Isaac H. Clark, Boston, Mass. Antedated November 27, 1868.

I claim, 1st, Combining with the discharge water of a force pump or fire engine, a stream, jet, or flowage of carbonic acid gas, for the purpose and to produce results before stated.

2d, As one mode of producing and applying the said gas, the employment of the furnace constructed as before explained, and combined with the air-pump and discharge water of the engine, essentially as herein shown and described.

3d, The combination, with a force-pump or engine, otherwise of ordinary or well-known construction, of an air-pump for introducing or ejecting carbonic acid gas into the discharge water of such engine, after such water may have left the pump cylinders, for the purposes substantially as before explained.

84,614.—WINDMILL.—Saml. H. Halstead, Godfrey, Ill, administrator of the estate of Jesse R. Clough, deceased.

I claim the triangular vanes, L, arranged substantially as described, so that their narrow faces, P, are exposed to the direct action of the wind on entering the wheel, and the adjoining faces, Q, are exposed to its action when leaving the wheel.

84,615.—STEAM ENGINE VALVE GEAR.—Joseph Crampton, New York city.

I claim the combination of the reversing lever, G, link F, and valve operating beam, E, the whole arranged relatively to each other, and to the cylinder-trunnion and valve, substantially as and for the purpose herein specified.

84,616.—CARTRIDGE BOX.—Silas Crispin, New York city.

I claim, 1st, The removable carrier block, B, when provided with its own flap, and adapted to fit an outer case or cartridge box, substantially as and for the purposes described,

2d. In combination with the cartridge carriea block B, and the outer case or cartridge box, the ledges or battens, a', applied in the manner and for the purpose described.

84,617.—STEAM, GAS, AND WATER STOP COCK.—W. H. De Valin, Sacramento, Cal.

I claim, 1st, In a stop cock in which the valve or plug is arranged within the case in the manner described, the combination of the valve with a disconnected flanged valve stem having its seat or bearing against the cap by which the valve chamber is closed, and held in place by means of a handle, arranged and operating substantially as herein described.

2d, The combination and arrangement of the valve stem and cap for closing the valve chamber, with the handle for operating the stem, and the cap and spring for retaining the handle in place, and holding said stem up in its seat, substantially as herein specified.

3d, A stop cock such as described, having the valve stem formed in two parts, hinged together above the point where the stem bears or fits against the cap, for closing the valve chamber.

4th, The recessed and grooved handle and knob, and the flanged or winged cap, in combination with the valve operating stem, said parts being constructed and arranged to operate as herein shown and specified.

84,618.—TABLE.—Jean C. Drouhard and Adolphe L. Roye, New York city.

We claim, 1st, The divided center pillar, C, so constructed and combined with the legs, a, as to form the central support of a center table, one of the three legs of two console tables, and two of the four legs of two card tables, substantially as herein described.

2d, The combination of the jointed brace, G, hinged arms, d', fixed legs, a a, and movable legs or divisions, c c, of the divided center pillar, substantially as and for the purpose herein set forth.

84,619.—CHURN.—Samuel S. Elder, Springfield, Ill.

I claim, 1st, The within described construction and arrangement of agitators, F.

2d, The combination of the driving mechanism, arranged as described, with the agitators, F and C.

84,620.—MORTISING MACHINE.—W. L. Epperson, Louisville, Ky.

I claim, 1st, A treadle or lever for operating a mortising machine, the short arm of which is lengthened automatically as the lever is moved, to operate the machine.

2d, The combination of the cogged lever, F, and the segment, E, and connecting rod, H, substantially as shown and described.

3d, The arrangement of the adjustable tool carrier, A1, screw, O, and connecting rod, H, substantially as shown and described.

84,621.—ROPE BEARING ATTACHMENT IN MACHINES FOR STEAM CULTURE.—Max Eyth, New York city.

I claim curving the arms or "outstrippers," a a', upward, so that the same will clear the growing crops, as herein shown and described.

84,622.—STEAM ENGINE REGISTER.—Joshua Garsed, Frankford, Pa. Antedated Nov. 21, 1868.

I claim, 1st, The disk, M D, cross piece, C P, arms, A and A', shaft, S, and worm, Wlange, F L, wheel, T W, cap, C, and its boss L B, lever, L, and its pawl, P, shaft, U S, wheel, T W', and worm, W', shaft, S', and worm, W'', wheel, T W'' and hand, H, all arranged, constructed, and combined in the manner and for the purposes herein set forth.

2d, A register for steam engines or other purposes, arranged and operating substantially in the manner herein specified.

84,623.—LAMP.—John Gibbs, Brooklyn, E. D., N. Y.

I claim the pressure roller or rollers, d, supported in slots, c', when operated by the sliding stem, e, in combination with the feed roller, C, substantially as shown and described.

84,624.—BRICK MACHINE.—Henry H. Gray, Haverstraw, N. Y., assignor to himself and Moses B. Pardee, Norwalk, Conn.

I claim, 1st, The stair shaped stops, j, in combination with standard, l, cross bar, e, and plunger, F, substantially as and for the purpose set forth.

2d, The yielding latch, b', in combination with the pusher bar, r, substantially as and for the purpose described.

84,625.—STAMP AND DIE FOR SHEET METAL.—W. D. Grimshaw, Newark, N. J.

I claim, 1st, The employment of four cylinders, y1 y2 y3 y4, combined with the main cylinder, F, to equalize the pressure upon the four corners of the guide plate, H, fig. 4, when descending on the four guide posts, z1 z2 z3 z4, constructed, adapted, and arranged substantially as set forth.

2d, The top plate, C, with circular passages, x w and v, in combination with the five cylinders, as specified and shown.

3d, The levers, o m n l, and the treadles, p and q, when combined with the five cylinders for graduating the pressure upon the plate, A, fig. 4.

84,626.—HEATING STOVE.—Elizabeth Hawks, Vineland, N. J.

I claim, 1st, The base, A, constructed as described, with a partition, B, dividing it into two chambers, and which partition is provided with holes, b b, and slides L L, substantially as and for the purposes herein set forth.

2d, The arrangement of the cylinders, D and E, and upright plates, F F, forming a flue for the passage of the smoke, etc., and leaving the balance of the chamber between said cylinders for hot air, substantially as herein set forth.

84,627.—PRINTING PRESS.—Richard M. Hoe and Stephen D. Tucker, New Yorkcity.

We claim, 1st, The combination of two feeding tables with the means described, or the equivalent thereof, for taking the sheets of paper alternately from the opposite feeling tables and conducting them to the impression cylinder, substantially as and for the purpose described.

2d, Separating the sheets by mechanism, substantially as described, so that they will be delivered in files, substantially as set forth and specified.

3d, The means, substantially as herein described, for clamping stereotype or other printing plates directly to the surface of a type cylinder, as set forth.

84 628.—TOY FISH.—Robert Hunter, New York city.

I claim the application of the vibrating tail as a propeller for mechanical fish, toy boats, etc., substantially as and for the purpose stated.

84,629.—BOOT CRIMPER.—F. C. Jackson, Peru, Ind.

I claim the slide, B, provided with two triangular frames, projecting inward, and operated as specified, to cause an equal pressure on the board, D, as herein shown and described.

84,630.—BUT HINGE.—George A. Jenks (assignor to himself and James Maguire), Chicago, Ill.

I claim the arrangement and construction of the two wings of the but, with their pivots on the upper and lower bowl pointing toward the center, with a recess for the other bowl, c, by which the hinge or but can be adjusted, substantially as shown and described.

84,631.—MACHINE FOR REDUCING LEATHER.—Wm. C. Joslin, Putnam, Conn.

I claim the combination with the receiving and delivering rolls, B B C C, bed, D, and reciprocating knife ar reducer, E, of the sliding blocks, I I, and cranks or eccentrics, with their pitmen or rods, H H, arranged for operation together essentially as specified.

84,632.—MECHANICAL MOVEMENT.—Moritz Laemmel Bay Ridge, N. Y.

I claim the arrangement of an adjustable shaft, B, in combination with the lever segments, C, operated alternately by treadles or hand levers, and connected to the shaft, B, by clutch pulleys, or other equivalent mechanism, substantially in the manner and for the purpose shown and described.

2d, The arrangement of a dog, E, and friction strap, i, in combination with a pulley, b, lever segment, C, and shaft, B, substantially as and for the purpose set forth.

84,633.—WASH POUNDER.—P. A. La France, Elmira, N. Y., assignor to himself and Oliver B. Gray, New York city.

I claim a rubber shield or pad attachment to a wash pounder, in general form and device substantially as and for the purposes described.

84,634.—GANG PLOW.—James B. Logan, Richview, Ill.

I claim the combination and arrangement of the beams, H, swinging beams, O and G, the hangers F, and lever, E, the arrangement being such that the plows are drawn by the levers, O, which are attached to the forward ends of the levers thereof, substantially as shown and described.

84,635.—EXPLOSIVE PROJECTILE.—Jacob Long, Shaver's Creek, Pa.

I claim the combination of a loaded shell with the barrels, A, each containing several charges of powder and ball, arranged so as to discharge their contents in succession after the bursting of the shell, substantially as described.

84,636.—MANUFACTURE OF ILLUMINATING GAS.—Charles B. Loveless, Syracuse, N. Y.

I claim, 1st, The combination of the battery, h, as constructed with the oil reservoir, a', containing perforated lead pipe, n, and gasometer, a, and float, b, for generating hydrocarbon gas, as herein set forth.

2d, The combination of the pipe, k', lead pipe, n, with perforations, pipes, l and t and o, with gasometer, and descending gas pipe, r, with gasometer, and pipe, d, with gas burner, also the rod, q', with pipe, g, for guiding the float in the gasometer.

3d, The perforated lead pipe, n, with oil reservoir, a', as described and for the purposes set forth.

4th, The heater, g, constructed substantially as described, and operating as and for the purposes set forth.

5th, The combination of the pipes, k and k', as described, and for the purposes of an oxyhydrogen blowpipe, as set forth.

84,637.—REVOLVING STAY LOG FOR CUTTING VENEERS.—John N. Lyman, New York city.

I claim a revolving stay log, constructed as described, and for the purpos herein set forth.

84,638.—CEMENT.—E. V. Machette, Jr., and E. M. Crary, Philadelphia, Pa.

We claim a cement, composed of the above named ingredients, in or about the proportions aforesaid, for the purpose specified.

84,639.—GRATE FOR BRICK KILNS.—John Maltpress, Edgerton, Wis.

I claim the movable grates, B B, constructed as described, in sections, and provided with dampers, a a, said dampers being operated by levers, b b, for the purpose of increasing or diminishing the heat in the whole or a part of a brick kiln, substantially as and for the purposes herein set forth.

84,640.—APPARATUS FOR REDUCING WOOD TO PAPER PULP.—Henry Marx, Pikesville, Md.

I claim, 1st, The stone, O, employed for regrinding fragments separated from the blocks by the stone, B, substantially as and for the purpose explained.

2d, The chain, E, employed to hold or press the blocks to the surface of the stone, B, substantially as explained.

3d, The counter chain, H, for retracting the chain, D, for the insertion of fresh blocks.

84,641.—FLUTED TRIMMING.—L. H. Maudelbaum, New York city.

I claim the within-described compound fluting, made of muslin or other suitable material, and composed of large, regularly formed flutes, c c, divided by straight line depressions, e e, and bounded on either side by more numerous and smaller flutes, b b, having flattened borders, a a, exterior to them, substantially as shown and described.

84,642.—AUTOMATIC BOILER FEEDER.—Henry McGann, Cleveland, Ohio.

I claim, 1st, The combination of the slide valve, F, with the arm, D, shaft, a, float, B, case, A, and chest, C, substantially as specified.

2d, The supplementary chest, C, in combination with the shell, A, as set forth.

84,643.—MARTINGALE.—Patrick J. McGuiness, N. Y. city.

I claim, as a new article of manufacture, an ornamental elastic standing martingale, consisting of the leather loop, A, rubber elastic strap, D, metallic flat tube chains, H, and swiveled snap hooks, I, all constructed and arranged as herein described.

84,644.—MODE OF PRODUCING STEEL.—James Myers, Jr., Brooklyn, N. Y., assignor to Barron's Steel Manufacturing Company.

I claim, 1st, The conversion of cast iron into steel, by the combination of the two processes of decarburation and recarburation above described, in the manner and for the purpose substantially as above stated.

2d, The conversion of articles of malleable cast iron, produced by any known process, into steel, by the application of gases produced from any solid or liquid carbonaceous substances, in the manner substantially as described.

3d, The production of cast steel, by remelting steel formed from malleable cast iron, when made in the manner above described.

84,645.—HOOK AND CORNICE FOR SUSPENDING PICTURES.—William Potts, Handsworth, England.

I claim a metallic picture rail, that is to say, a metallic strip or bar, whose lower or inner edge is turned upward, so as to constitute a rail upon which the picture supporting hooks can freely slide, provided with an ornamental covering or casing, of a metallic or non metallic substance as described, and attached to the wall of the room by means of screws or staples, in the manner shown and set forth.

84,646.—LOW WATER INDICATOR.—John W. Richards, Newark, N. J.

I claim the fixed valve, E, constructed of a tubular character as described, and hung so as to be capable of expansion, away from its seat, for action in concert with the tube, D, substantially as described.

84,647.—LAST BLOCK ELEVATOR AND INSTEP STRETCHER.—Seelye Richmond, Annapolis, Md.

I claim, 1st, The inclining slot, b, in the rear part of the last block, B, in combination with the nut, D, substantially as and for the purpose set forth.

2d, The combination of the slot, b, nut, D, short screw, C, and nut, F, when operating as a last block elevator, substantially as described.

3d, The screw socket, H, when constructed as described and shown, and operating in a last, substantially as and for the purpose set forth.

84,648.—CAR COUPLING.—Ephraim Russell, Waynesburg, assignor to himself and Reynard Yost, Honey Brook, Pa.

I claim the open link, A, and the sliding handle, B, in combination with a slotted draw head, all constructed and operating together, substantially as and for the purpose described.

84,649.—CULTIVATOR.—Roger Sandiford, Joliet, Ill.

I claim, 1st, The segmental oscillating coupling clevis, shown in figs. 1 and 2, consisting of the parts, a d n, and the part, o, shown in fig. 3 when applied to a cultivator in the manner and for the purposes set forth.

2d, The metal cross piece, A, in combination with the post or frame, c, and supporting arms, B B, constructed and arranged in the manner described.

84,650.—WATER PROOF SHOE.—Frederick M. Shepard, New York city.

I claim a boot, shoe, or other such like article, made of vulcanized india rubber or allied gum, with a plate, or sections of a plate, or the equivalent thereof, made of metal or equivalent material, embedded in the india rubber sole while in the green or plastic state, to which, after vulcanization, an outer sole can be secured, substantially as and for the purpose specified.

84,651.—CARTRIDGE HOLDER.—J. S. Smith, Brooklyn, N. Y.

I claim the casing or holder herein described, adapted to receive cartridges, and to support them with firmness by the springs, n, formed of the same metal as the respective pieces, B and C, substantially as and for the purposes herein set forth.

84,652.—GANG PLOW.—Andrew Smith (assignor to T. J. Carter, and W. P. Watson), Portland, Oregon.

I claim, 1st, The combination of the lever, O, having the offset, o, with the ratchet, P, rod, R, having the tooth or shoulder, r, and lever, T, the whole operating substantially as and for the purpose described.

2d, The arrangement of such frame, when constructed as herein described, in combination with a downward bent axle, D, the box strap, e, the braces, H H, the draft pole, G, and the wheels, F F.

3d, The arrangement of the clevis, K, braces, H H', king bolt, C, cross bar, A3, and axle, D, the axle being behind the king bolt, and the latter being supported by the braces and the cross bar, substantially as herein described.

4th, The braces, u and v, attached, at their lower ends respectively, to the mold board and standard, and at their upper ends provided with screw threads, upon which are fitted, above and below the plow beam, through which the braces pass, adjusting screw nuts, substantially as and for the purpose specified.

84,653.—FARM GATE.—Byron Snyder, Clinton, Wis.

I claim the rigid lever, E, eccentric lever, D, and latch bar, F, in combination with the pulleys, I I, cranks, i i, endless band or chain, K K, clasps, a a, gate, A A, posts, B C c'' H H, and latches, f and g, when constructed substantially as described, to operate as specified.

84,654.—CONSTRUCTION OF RUBBER AND OTHER ELASTIC SPRINGS.—Daniel E. Somes, Washington, D. C.

I claim, 1st, A spring, composed of a series of elastic tubes, one within another, substantially as set forth.

2d, A spring, composed of a series of elastic spheres, one within another, and either air tight or perforated, substantially as set forth.

3d, A spring, composed of elastic tubes or spheres, surrounded by elastic bands or rings, substantially as set forth.

84,655.—BOX TO CONTAIN CIGARS, MONEY, ETC.—Nathan Thompson, Brooklyn, E.D., N.Y.

I claim the combination with the box or shell, A, of the lid or cover, B, pivoted, by or through side arms, b b, to the sides of the box, for operation in relation to the mouth thereof, substantially as shown and described.

84,656.—REVOLVING HARROW.—William R. Toby, Nunda, and Myron J. Barcalo, Mount Morris, N. Y.

We claim, 1st, The combination of the slack chain, d, with the weighted rollers, D, arm, b, and beam, B, arranged as described, and operating substantially as and for the purpose described.

2d, The draft rod, g, and gage bearing, h, in combination with the beam, B, and friction roller, i, arranged and operating substantially as and for the purpose herein set forth.

84,657.—BOX FOR LARD, BUTTER, AND SIMILAR SUBSTANCES.—Charles L. Tucker, Chicago, Ill.

I claim, 1st, As a new article of manufacture, a box for packing lard, butter, and other similar substances, made by coating wood pasteboard, or other suitable material, with a stiffening cement of glue and starch, with or without earthy materials, substantially as described.

2d, A cement for preparing boxes composed of glue or gelatine, combined with starch or its equivalent, with or without the addition of earthy materials, as described.

84,658.—CHURN.—William B. Tucker, Columbus, Ohio.

I claim a churn dasher, of a diamond form, as herein shown and described, as an improvement to my Letters Patent, bearing date March 12, 1868.

84,659.—COMBINATION LOCK.—A. B. Vandemark, Phelps, N. Y.

I claim the combination and arrangement, with the disk tumblers, E E1 E2 E3, provided with spring bearings, k k, of the cams, D D, on the spindle, having an end motion to engage in one position with two of the tumblers and, in opposite position with the other two, said tumblers, by twos, being set by the reverse turns of the spindle, as herein set forth.

84,660.—OPERATING CAPSTAN.—W. W. Vanderbilt, New York city.

I claim 1st, The arrangement and combination of the engines, A A, couplings, a a, pumps, C C, gear wheels, f g i, capstan, E, and friction cone, j, all constructed and operating substantially as and for the purpose herein set forth.

2d, The regulating screw, s, in combination with the lever, q, friction-cone j, cog wheels, f g and capstan, E, substantially as and for the purpose described.

3d, The arrangement of the back gear, m o, in combination with the cog wheel, l, bevel wheels, f g, capstan, E, crank shaft, D, and engines, A A, all as and for the purpose described.

84,961.—BLIND FASTENER.—Frederick Veazie, Worcester, Mass.

I claim the construction and arrangement of the blind fastener, having the raised surface, d, the shoulder, g, and cavity, B, to hold the spring, E, and notches and shoulders on the bed piece, when constructed and operating in the manner and for the purposes above set forth and described.

84,662.—WAGON BRAKE.—William T. Ward, Indianapolis, Ind.

I claim, 1st, The application of one or more weights, H, by whose specific gravity the cans or rubbers, F, are kept to the periphery of the wheels, substantially in the manner and for the purposes specified.

2d, The strap, L, provided with the holes, n|n, and bolt or pin, O, as and for the purposes set forth.

84,663.—SCREW.—F. Washbourne, New York city.

I claim in a screw, the head and shank of which are made in separate pieces, extending the slot, D, in the head of the screw downwards into the shank, substantially as described.

84 664.—COMBINATION LOCK.—Jarvis B. White, Detroit, Mich.

I claim 1st, The projections, d d', on the rods, C C', in combination with a series of holes and the slots, e e', on disks, f f', substantially as and for the purposes set forth.

2d, The combination lock consisting of the rods, C C', provided with projections, c c', and d d', with the dials, a a' and knobs, b b', attached to and passing through the drawer, and engaging with the slotted revolving disks, f f', secured by rims, S h', over recesses, j, in the back wall of the casing all arranged, constructed, and operating substantially as and for the purposes set forth.

84,665.—CARRIAGE JACK.—Jarvis B. White, Detroit, Mich.

I claim the carriage jack consisting of the side pieces, A A', lifting bar, C straps, D, arranged and operating substantially as described.

84,666.—CORN PLANTER.—Albert Windeck, Peoria, Ill.

I claim, 1st The slides, a a, with forks, m, for operating the valves, k, in combination with plates, R, having ribs, j j, fitting the grooves, and gages, b substantially in the manner and for the purpose as herein set forth.

2d, The valves, k, in combination with the slides, a a, when constructed and operated substantially as set forth.

3d, The construction of the valves, k, curved straight across at their bottom ends outwardly, and divided in the middle, at their upper ends, and curved outwardly in reverse directions, substantially as and for the purpose set forth.

4th, The construction of the plate, d, with diamond-shaped teeth for cut-offs, in the bottom of the seed boxes, substantially in the manner and for the purpose as set forth.

84,667.—LUBRICATING AXLE.—J. L. Winslow, Portland, Me.

I claim the hollow journal, having the parts, d b, collar, k, and sliding pieces, e e, as and for the purposes set forth.

84 668.—CHURN.—Frederick Whitton, South Carrollton, Ky.

I claim the churn dasher, composed of the piston, A, and the four pieces, B B B B, arranged together, and constructed as and for the purpose set forth and described.

84,669.—SUSPENDER.—Samuel Warren Henlon, Selma, Ala.

Antedated June 1, 1868.

I claim the suspender, or shoulder brace, composed of two single straps, C C, each passing from its attaching strap at the one side, over the shoulder, to the attaching strap on the other side of the body, substantially as herein stated.

REISSUES.

79,180.—MODE OF SECURING BUCKLES AND RINGS TO HARNESS.—Dated June 23, 1868; reissue 3,216.—R. B. Anderson, Oneida, Ill.

I claim securing buckles, rings, and snap hooks to leather straps by means of a tapering metallic box, B, secured by pegs or teats, a a, or their equivalents, whereby the ends of the strap are enclosed, as specified.

46,553.—MACHINE FOR STRETCHING HAT BODIES.—Dated February 28, 1865; reissue 3 217.—Eickemeyer Hat-Blocking Machine Company, Yonkers, N. Y., assignees of Rudolf Eickemeyer.

I claim, 1st, In a machine for stretching hat bodies, a skeleton or ribbed and recessed former, substantially such as is herein described.

2d, The combination and arrangement of the crown and tip supporting ribs with the upper series of stretching devices, substantially as described, operating to stretch the tip and side crown of the hat body between them, substantially in the manner hereinbefore set forth.

3d, The combination and arrangement of the brim supporting ribs with the lower series of stretching devices, substantially as described, operating to stretch the brim of the hat body between them, substantially in the manner set forth.

4th, In combination with the supporting ribs of the skeleton former, the stretching devices, operating as hereinbefore set forth, to stretch the hat body between them at one operation, as required for blocking, substantially as described.

5th, The clamping ring, in combination with the ribs of the skeleton or ribbed former, operating to hold the hat body thereon during the operation of stretching, substantially as described.

6th, The combination, in a machine for stretching hats, of the skeleton or ribbed and recessed former, a clamping ring, and a system of stretching arms or rollers, the whole combined and operating substantially as described.

7th, Making the stretching devices for the tip or brim adjustable radially, with relation to each other, so as to vary the degree of stretching of either tip or brim, substantially as described.

40,084.—TUCK CREASING ATTACHMENT FOR SEWING MACHINES.—Dated September 22, 1863; reissue 3,218.—Henry W. Fuller, Brooklyn, N. Y., assignee, by mesne assignments, of Israel M. Rose.

I claim, 1st, The mechanism, substantially such as herein described, for forming a ridge or ridges on fabrics, to be afterward folded in the line of such ridges.

2d, The method of nipping or pinching the fabric, to form ridges or creases

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es thereon, as aforesaid, by means of jaws opened and closed at intervals, to seize and pinch the fabric when at rest, and then release it as the same is moved along intermittently by a suitable feeding mechanism, as set forth.

3d, The combination, with the jaws arranged as aforesaid, for action on a fabric, of a bed plate or plates to support the fabric, receiving and resisting the impingement of the jaw or jaws thereon, substantially as specified.

4th, A pinching mechanism, substantially as set forth, and in which the jaws are brought down in contact with and made to impinge upon the fabric while yet open, and are closed by the resistance then offered to the further descent of the jaws, substantially as described.

5th, The combination of the creasing device or devices of a tuck marker with a jointed lever, substantially as and for the purposes set forth.

6th, A tuck-creasing mechanism, substantially such as described, having its upper and lower parts connected, and together adjustable, as to its relation with the needle of a sewing machine, and operated by the sewing machine substantially as set forth.

7th, The spring, G, for carrying the upper half of the creasing device away from the cloth after each creasing action, when relieved by the needle arm substantially as set forth.

8th, The combination with a tuck-marker, having upper and under parts connected and together, adjustable as specified, of the lever and spring, substantially as and for the purposes set forth.

21,268.—HORSE RAKE.—Dated August 24, 1858; re-issue 3,219.—Adam R. Reese, Phillipsburg, N. J., assignee of Ann Morgan, administratrix of the estate of Mirick Morgan, deceased.

I claim, 1st, In a two-wheeled wire tooth hay rake, having a stationary axle with teeth separately hinged, the combination of a spring to each tooth to assist in holding it to the ground, and attached to the rake head by the same bolt which attaches the tooth, at a point between and within the periphery of the wheels and a lever, operated by the driver while riding on the seats for raising and lowering the teeth.

2d, In combination with a two-wheel wire tooth hay rake, the teeth of which are each separately and independently hinged against backward strain at a point between and within the periphery of the wheels, a device, operated by the attendant while riding on the seat, for raising the teeth, and stationary cleaner rods for holding the hay down in the upward movement of the teeth.

3d, Hinging the teeth independently to cast iron plates or heads, which are in turn, connected to a common rocking head or shaft, operated by the attendant, for raising the teeth while riding on the seat.

4th, In combination with a two-wheel wire tooth hay rake having a stationary axle, with the teeth separately and independently hinged to a rake-head or support which is hinged or pivoted between and within the periphery of the wheels, a device operated by the attendant while riding on the seat, for raising the teeth out of the gathered hay.

5th, In a two-wheeled wire tooth hay rake, having a stationary axle, the combination of teeth hinged separately between and within the periphery of the wheels, and a stop to each tooth, to prevent it from falling below a certain point, and for holding it while being raised by the operator while riding on the seat.

6th, The combination, in a two-wheeled wire tooth hay rake with a stationary axle, of a support for the teeth between and within the peripheries of the wheels, that will admit of an upward and downward motion to each tooth, without the movement of the head that supports them against backward strain, and a stop for limiting its downward motion, and for enabling the attendant to raise the teeth from the ground by means of a device operated while riding on the seat.

7th, Independently-hinged wire teeth, each provided with a sustaining spring applied thereto, and united to the rake shaft or roller by a single screw bolt, in such manner that each tooth can be taken off by removing a single burr that holds it in place.

8th, In combination with a two-wheel wire tooth hay rake, the teeth being supported against their backward strain between and within the periphery of the wheels, a device operated by the attendant while riding on his seat, for locking the teeth to the ground, so as to prevent the teeth from rising over the accumulated hay while in operation, and a device for cleaning the teeth of the gathered hay in their upward motion.

9th, In combination with a two-wheel wire tooth hay rake with stationary axle, having the teeth separately hinged to a rake head, between and within the periphery of the wheels, a hand lever attached to said head and operated by the attendant, for raising the teeth while riding on the seat.

10th, In combination with a two-wheel wire tooth hay rake, the teeth being supported against their backward strain between and within the periphery of the wheels, a device operated by the attendant while riding on the seat, for raising the teeth with stationary cleaner rods, supported at the inner end only, for holding the hay down while the teeth have their upward movement.

11th, Supporting the stationary elastic wire cleaner rods of a two-wheel wire-tooth hay rake, between and within the periphery of the wheels, for the purpose of holding the hay and straw down, with a device for raising the teeth, operated by the attendant while riding on the seat.

10,498.—MACHINE FOR CLEANING AND ASSORTING BRISTLES.—Dated February 7, 1854; extended seven years, re-issue 3,220.—Division A.—Nathan H. Spafford, Boston, Mass., assignee, by mesne assignments, of George Edward Burt.

I claim, 1st, A machine for combing bristles, combining in its construction the following elements, viz: a comb, a clamp for holding the bristles while subjected to the action of the comb, and suitable mechanism for passing the comb through the bristles, and for combing the same substantially as set forth.

2d, In combination with the comb, a movable clamping apparatus, by which the bristles are brought into proper position to be acted upon by the combs.

3d, The combination of the movable combs, T and U, with the clamping belts, E and L, F and M, combined and operating substantially as described.

4th, In combination with the dragging and conveying mechanism, the double brush belts, arranged to act as conveyors, substantially as set forth.

5th, A machine for dragging and assorting bristles, combining in its construction the following groups of elements, viz: mechanism for combing the bristles, a conveying mechanism, for carrying the bristles after being subjected to the action of the comb, and mechanism for successively taking up the bristles of different lengths, substantially as described.

6th, A conveyer so arranged, as to clamp the bristles between two surfaces, for holding them in such a manner that one end of the bristles may project therefrom, in combination with an assorting mechanism, so arranged in relation thereto that the bristles shall be separated and taken out successively, according to their lengths, substantially in the manner set forth.

7th, The spring board, p, and hammer, r, combined and arranged to operate substantially in the manner and for the purpose specified.

8th, The combination of the combs, u2 v2, with the grooved delivering rollers, arranged to operate substantially in the manner and for the purpose specified.

10,498.—MACHINE FOR CLEANING AND ASSORTING BRISTLES.—Dated February 7, 1854; extended seven years; reissue 3,221.—Division B.—Nathan H. Spafford, Boston, Mass., assignee, by mesne assignments, of George Edward Burt.

I claim, 1st, The method of applying combs or rakes by giving motion to the combing or raking apparatus, by means of the crank, k, rocker-shaft, b, or their equivalents, so combined and operated as to give a curvilinear movement to the teeth, substantially as above described.

2d, The staff, g, carried near its centre upon the rotating crank shaft, k, and connected to the main frame, near one end of the staff, by any mechanism admitting both the rotating and backward and forward motion, simultaneously, so constructed and arranged as to allow the crank to revolve freely and carry the combs or rake, T, upon the operating end of the staff, g, all arranged and operating substantially as described.

3d, The combination of the staff, g, attached, as above described, at one end, to the frame, C, the box, 2, the crank, k, and the comb or rake, T, when combined to operate substantially as described.

4th, Connecting the comb or rake, T, to the main frame with three movable junctions or joints, constructed and arranged to allow the staff to assume freely any angle caused by the revolutions of the crank, substantially as described and set forth.

5th, The arm, b, or its equivalent, when attached to the main frame, and so constructed and arranged as to hold in position the upper end of the staff, g, and admit the staff to play freely in all the various angles of the same, caused by the revolutions of the crank, k, substantially as described.

6th, The combs or rakes, T and U, composed of any number of teeth, and attached to staves actuated by crank-shafts, and held in position by mechanism so arranged that, by revolving the cranks, there shall be imparted to the forks a curvilinear motion, substantially as described.

7th, The cranks, k and l, in such relative position with each other that they will cause the combs or rakes that are attached to them to act alternately, substantially as described and set forth.

8th, Supporting or sustaining the combs or rakes upon fulcra which move in the arc of a circle, said rakes having also a rocking or back-and-forward motion upon said moving fulcra, substantially as described and for the purpose set forth.

66,785.—METHOD OF CONVERTING IRON INTO STEEL.—Dated July 16, 1867; reissue 3,222.—The Barrons Patent Steel Manufacturing Company, New York city, assignees of John F. Boynton.

We claim, 1st, In carrying the above described method into effect, the use of gas surcharged with carbon by being passed through a carbonized vessel, as as above described, and mixing or combining the gas, so produced, with hydrocarbon vapors, by any known means of producing that result.

2d, Also, in carrying the above described method into effect, the use of other gasses, hereinbefore mentioned, when charged with hydrocarbon vapors.

3d, Also, in carrying the above described method into effect, the use of atmospheric air charged with hydrocarbon vapors, by any known means of producing that result.

4th, Also, in carrying the above described method into effect, the heating of heavy hydrocarbons, to cause their vapors more readily to mix or combine with the gases or air, and be carried forward therewith.

5th, Also, melting iron or the nitro-carbonized compound, after it has been converted into steel by the above described method, and thereby converting it into cast steel, as described.

6th, Also, in carrying the above described method into effect, the use of hydrocarbon vapors without admixture with gas or air, as and for the purset forth.

7th, In carrying into effect the method herein described, of converting iron into steel, coating a portion of any piece of iron with a wash, as described, to prevent the portion so coated from being converted into steel.

8th, Also, converting the oxides of iron directly into steel by one heating, by passing carbureted or carbonized hydrogen gas over and through the same when in a highly heated state, according to the method or process herein described.

DESIGNS.

3,265.—TRADE MARK.—Leonidas L. Coleman, Nashville, Tenn.

3,266.—AXLE BOX FOR RAILWAY CARRIAGES.—John Corrigan, Charlestown, Mass.

3,267.—CARPET PATTERN.—Benjamain Crabtree, Jr., Philadelphia, Pa.

3,268.—CARPET PATTERN.—Israel Foster, Philadelphia, Pa.

3,269.—BRIDLE FRONT, etc.—Charles Frazer, New York, city.

3,270 to 3,271.—PRINTERS' TYPE.—Hermannn Ilenburg, (assignor to Mackellar, Smiths, and Jordan), Philadelphia, Pa. Two Patents.

3,272.—PRINTERS' TYPE.—Peter A. Jordan, (assignor to Mackeller, Smiths and Jordan), Philadelphia, Pa.

3,273.—PRINTERS' TYPE.—Andrew Little, New York city.

3,274.—CLOCK CASE.—Nicholas Miller, New York city.

3,275.—SPOON OR FORK HANDLE.—Charles F. Richers, New York city.

3,276.—FORK OR SPOON HANDLE.—George Wilkinson, Providence, R. I.

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U. S. PATENT OFFICE,
WASHINGTON, D. C., Nov. 25, 1868.
Noble T. Greene, of Providence, R. I., having petitioned for an extension of the patent granted him on the 13th day of March, 1855, for an improvement in "Cut off Valves for Steam Engines," it is ordered that said petition be heard at this office on the 15th day of February next.

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U. S. PATENT OFFICE,
Washington, D. C., Nov. 28, 1868.
G. W. N. Yost, of Corry, Pa., having petitioned for the extension of a patent granted him on the 20th day of March, 1855, for an improvement in "Cultivators," it is ordered that said petition be heard at this office on the 22d day of February next.

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U. S. PATENT OFFICE,
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John Stainthorp, of Brooklyn, N. Y., having petitioned for an extension of the patent granted him on the 6th day of March, 1855, for an improvement in "Machines for Making Candles," it is ordered that said petition be heard at this office on the 15th day of February next.

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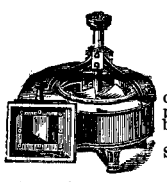

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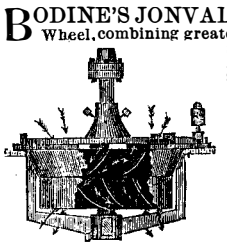

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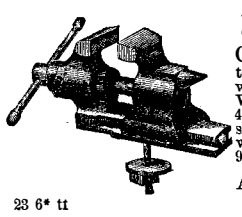

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